WEST LAKES
SEDIMENT REMOVAL PLAN

RECEIVED
OCT 0 3 2005
Division of Fish & Wildlife

NOBLE COUNTY, INDIANA

SEPTEMBER 2005

STIENBARGER LAKE TO WALDRON LAKE CHANNEL
JONES LAKE TO WALDRON LAKE CHANNEL

WEST LAKES CONSERVATION INC
0781 EAST WILLOW LANE
WAWAKA, INDIANA 46794
260-761-4830

WEST LAKES CONSERVATION INC.
0781 East Willow Lane
Wawaka, IN 46794
260-761-4830

September 28, 2005

Mr. Jim Ray
Chief, Land and Water Conservation
Indiana Department of Natural Resources
Division of Soil Conservation - Room W265
402 west Washington Street
Indianapolis, IN 46204-2739

RE: Application for LARE funds

Dear Mr. Ray;

The West Lakes Association would like to request LARE grant funds for two channel dredging projects. A binder is hereby enclosed which includes our Sediment Removal Plan. Our pre-application was previously submitted. Included the report is the channel sediment field analysis, sediment laboratory analysis, and selected a sediment basin disposal site.

If you have any administration questions or concerns regarding the application, please give me a call at 260-761-4830. If you have technical questions relating to the field surveys, cross sectioning, cost estimates, or just needing additional information, please contact Mr. Rick Smigielski at 574-250-2538.

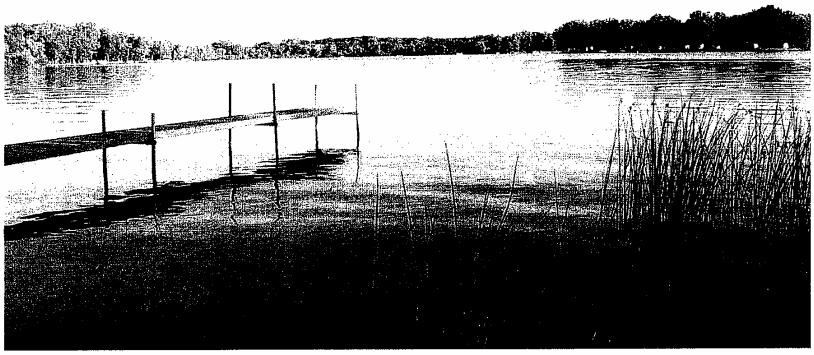
Sincerely,

Dave Wick
President

WEST LAKES
SEDIMENT REMOVAL PLAN

NOBLE COUNTY, INDIANA

SEPTEMBER 2005



STIENBARGER LAKE TO WALDRON LAKE CHANNEL
JONES LAKE TO WALDRON LAKE CHANNEL

WEST LAKES CONSERVATION INC
0781 EAST WILLOW LANE
WAWAKA, INDIANA 46794
260-761-4830

WEST LAKES CONSERVATION, INC.
NOBLE COUNTY, INDIANA

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WEST LAKES CONSERVATION, INC
NOBLE COUNTY, INDIANA

SEDIMENT REMOVAL PLAN FOR THE STEINBARGER CHANNEL AND THE JONES CHANNEL

CHAPTER 1 - INTRODUCTION

1.1 Project Description and Purpose

There are four lakes in the West Lakes chain. Tamarack Lake (50 acres) feeds into Steinbarger Lake (73 acres) which feeds into Waldron Lake (216 acres) from the east. Jones Lake (114 acres) feeds into Waldron Lake from the Northeast. The north branch of the Elkhart River feeds into Jones Lake. The west side outlet of Waldron Lake is also the north branch of the Elkhart River.

Tamarack and Steinbarger Lakes are connected by a peninsula, which provides for separation between the two lakes. A 700-foot long natural channel connects Steinbarger Lake to Waldron Lake. Jones Lake connects to Waldron Lake by way of a 3000-foot long natural channel.

Neither of the natural channels has ever been dredged out before. The bottoms of the channels have filled with sediment to the point that some boats traveling back and forth between the lakes cannot get through. There are places in each channel that are only two-foot deep (August). Boat traffic between the lakes is ongoing during the day as fishermen and recreational boaters go back and forth. Waldron lake is the only lake of the four that allows for speed boating. Boaters utilize the channels to fish Tamarack, Stienbarger, and Jones lakes during the day and Waldron to ski, tube, and use of personal watercrafts. Personal watercrafts get plugged inlets from sucking up bottom channel sediments.

In order to pass between the lake, boaters must raise their boat propellers up so that they do not hit bottom. This happens for pontoon type in addition to V-bottom type boats. Inboard engine type boats cannot navigate the passageways.

1.2 Contact Information

The West Lakes Association consists of a four member elected board and a five-member panel of Directors. The association formally became incorporated as a not-for-profit on October 9, 1964. Current officers and directors consist of:

Officers	**Name**	**Address**
President –	David Wick	0781 east Willow Lane Wawaka, IN 46794
Vice President –	Sue Bock	0810 E Willow Lane Wawaka, IN 46794
Secretary –	Pam Frosch	1529 Crooked Creek Pkwy Fort Wayne, IN 46845
Treasurer –	Jane Silver	9695 N Wooded Drive Rome city, IN 46784

Directors	**Name**	**Address**
At Large-	Neil Hudson	10515 N Addis Road Rome City, IN 46784
Waldron Lake –	Cathy McLaughlin	0046 W Waldron Lake Drive Wawaka, IN 46784
Waldron Lake-	Mae Schlotter	0057 E Maplewood Drive Wawaka, IN 46794
Steinbarger Lake –	Margaret Boyer	PO Box 198 Churubusco, IN 46723
Jones Lake –	Tom Jones	4120 Maplecrest Road Fort Wayne, IN 46835
Tamarack Lake -	Curt Jefferies	0844 W Willow Lane Wawaka, IN 46794

Contacts for this project will be:

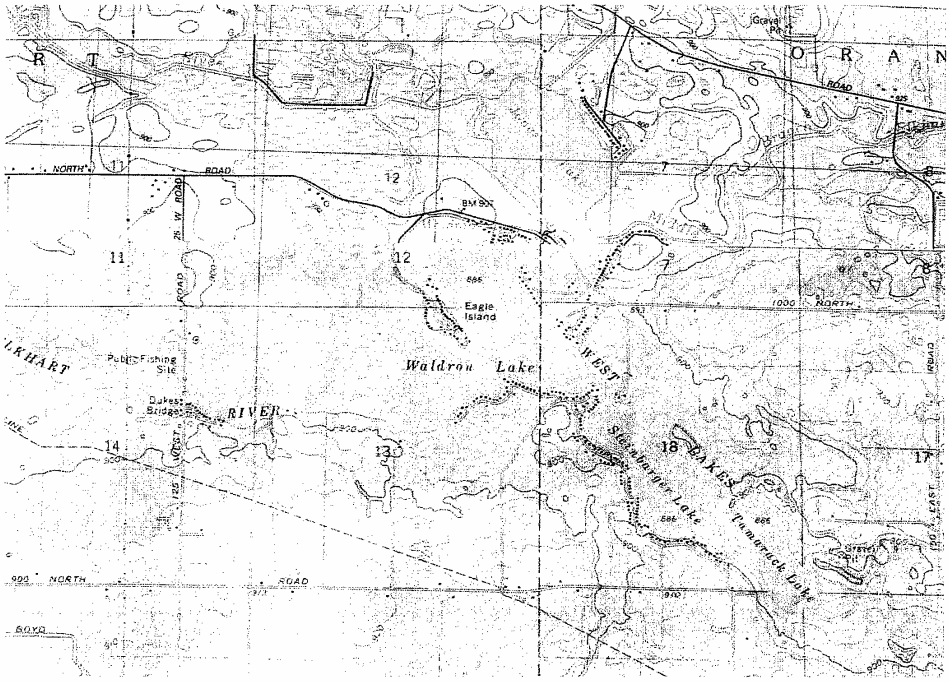
Administrative and signatory – David Wick
Address: 0781 East Willow Lane
Wawaka, IN 46794
Phone: cell 260-414-0330 home 260-761-4830
e-mail: WLAKEMOM@AOL.COM

Technical advisor – Rick Smigielski
Address: 52772 Emmons Road
South Bend, IN 46637
Phone: 574-250-2538
e-mail: rsmigielski@cityofbuchanan.com

Legal council –Mike Yoder
Address: PO Box 633
Kendalville, IN 46755
Phone: 260-636-2131
e-mail: mike.ym@mchsi.com

1.3 Project Location

The four lakes affected are Tamarack, Stienbarger, Jones and Waldron and are all located in Noble County. The closest community is Rome City. Tamarack, Stienbarger, and Waldron Lakes can be found on the USGS Albion quadrangle and Jones Lake can be found on the USGS Oliver Lake quadrangle map.



1.4 Public Involvement

Discussions regarding the need for dredging the two channels began around 1993 according to the lake association's public meeting minutes. The public meetings usually consist of approximately 100 people. Members and non-members are allowed to attend the open forum meetings. Meetings are held at the local *West Lakes Marina* where there is ample parking and meeting room space for those attending.

Sediment removal discussions at the meetings have included:

- Need for sediment removal
- Depth of sediment to be removed
- Methods of sediment removal
- Dredging contractors
- Project costs
- Sediment disposal locations
- Needed easements
- Funding sources
- Revenue generating projects for local match
- County assistance
- Regulated drain taxation fees (County residents voted down in 2004)

There have been several fundraisers that the lake association membership has sponsored. These have included:

- Sale of BBQ Chicken
- Garage Sales
- Hog Roast sales
- Door to door solicitations from individuals and companies
- Utilizing membership dues

1.5 Channel Descriptions

The two channels each have lakes on both ends. Therefore the sediment deposits on the channel bottoms are very light. Otherwise any heavier suspended matter would have fallen to the bottom of the upstream lake prior to entering the channel. Sediment coming out of the Stienbarger lake channel has developed into a shallow delta at Waldron's mouth. This is due to the lower channel velocity resulting in greater solids settling. The light weight sediment consists of primarily low density floating to suspended organics such as leaves, decaying aquatic plants, sticks and branches falling from overhanging trees. There are no industries upstream of Tamarack Lake to discharge sanitary or industrial wastes. Upstream of Jones Lake is Rome City, which is located on Sylvan Lake. The Sylvan Lake dam acts as an upstream sediment trap, only allowing the light suspended matter to discharge over the spillway. A moreatoreum was presented to all Noble county residents living on or adjacent to the County's waterways to implement a tax for maintaining streams and rivers. The ordinance was voted down in 2004. Therefore, these two channels were not added to the list as a County regulated drain.

Erosion controls methods have been adopted by the Lake Association by:

- Limiting maximum 10 mph speed limits for Tamarack, Stienbarger, and Jones
- Limiting maximum 10 mph speed limits for Waldron Lake from 5 pm to 10 am.
- Limiting speed limits during unseasonally high lake levels
- Placement of buoys approximately 200 feet off the Waldron lake shoreline
- Lowering of the lake levels during late fall, winter, and early spring months

The volume of sediment projected to be removed was determined by measuring the width of cannels with a 200-foot long fiberglass measuring tape and the channel lengths based on USGS maps. The stream depths in the channels were determined by field measuring with a survey rod and boat measuring from the surface water elevation down to the top of sediment.

CHAPTER 2 - DESIGN CRITERIA

2.1 Field Data Collection

The water level in Waldron Lake can vary a difference of 18-inches from the normal high water level in the early spring to the normal low water level in late summer. The water levels were close to average when the field depth measurements were taken. See channel cross section data in appendix.

The amount of sediment projected to be removed was based on obtaining a minimum four foot water depth during normal summer water level. Since the Jones channel is over 200 feet wide in some places, only a 30-foot wide sediment removal channel was figured.

The Jones channel varied in water depth from 2.3 feet at the shallowest to over 5 feet at the deepest.

The Stienbarger channel (approximately 50 feet wide) varied in water depth from 2.1 feet at the west end to 5.2 feet at the deepest spot in the channel.

2.2 Sediment Sampling

The channel sediment depths were determined by using a two-inch PVC pipe 10-feet long with graduated markings every 0.1 of a foot. The pipe was first lowered to the top of the sediment and the water depth recorded. Then the pipe was pushed downward through the sediment until it reached refusal or the 10 foot length of pipe, whichever came first. The depth was again recorded. Cross sections of the channels were taken every 50 feet (measured using a 300 foot fiberglass surveyors tape and 8-foot long lath station markings) with three depth measurements (both ends and the middle) per section. See appendix for cross section drawings.

During the field sampling of August 28th, 2005, sediment samples were withdrawn and composited for each channel. Sampling was conducted by using the 2-inch PVC pipe, inserting it into the sediment, capping the top of the pipe and then withdrawing

the sample. The sediments from each channel were composited and the sent to A & L Great Lakes Laboratories, Inc in Fort Wayne for analysis.

The sediments consisted of organic material, mostly consisting of silt and small particles of shell. The results of the laboratory analysis are as follows:

Nitrogen Analysis -Stienbarger Channel was 29 mg/kg; Jones Channel was 97 mg/kg
Total solids - Stienbarger Channel was 42.87 %; Jones Channel was 45.56 %

The analytical results of the test indicate that the samples all fell below the Indiana Department of Environmental Management (IDEM) ceiling concentrations for land application processing. The original laboratory reports may be found in the appendix.

Table 1
Sediment Sample Analytical Results

Parameter	EPA Ceiling Concentration Limit	Stienbarger Channel Wet mg/kg	Jones Channel Wet mg/kg
Arsenic	**75 mg/kg**	**2.724**	**3.934**
Cadmium	**85 mg/kg**	**0.428**	**<0.006**
Copper	**4,300 mg/kg**	**5.086**	**5.897**
Lead	**840 mg/kg**	**3.914**	**5.954**
Mercury	**57 mg/kg**	**<0.001**	**<0.001**
Selenium	**100 mg/kg**	**1.174**	**1.436**
Zinc	**7,500 mg/kg**	**17.338**	**21.952**
Chromium	-----	**1.685**	**2.373**
Silver	-----	**<1.0**	**<1.0**
Barium	-----	**58.4**	**34.9**

From the laboratory results, the channel sediments contain no sampled metals exceeding the EPA maximum Concentration Ceiling Limits

2.3 Design Surveys and Layouts

Prior to soliciating contractors for construction, the proposed site for the sediment basin will be surveyed and drawings prepared for the necessary scope of earthwork construction activities.

CHAPTER 3 – CONSTRUCTION CONSIDERATIONS

3.1 Land Agreements

A. Stienbarger Channel
The Stienbarger Channel project will require one property easement to run the dredging discharge hose over to the dewatering/containment facility and transport vehicles. The property owner is Mr. John McDonald

B. Jones Channel
The Jones Channel project will require one temporary road easement along County Road 1000 North.

C. Sediment Disposal Basin Site Easement

A property easement is necessary to run the dredging discharge hose over to the dewatering disposal basin. The filtered decant waters will be discharged back into the Jones Channel next to the Jones Channel supply pipe. The property owner for the easement is Mr. Joe Whetstone. A general site plan of the sediment basin and influent / effluent piping is shown in the appendix.

Sediment Disposal Basin Site Land Agreement

The proposed sediment disposal site is owned by Mr. Joe Whetstone and is shown in the Appendix. A land owner agreement with Mr. Whetstone is also included in the appendix.

3.2 Sediment Disposal Basin Construction

The basin will be constructed in the ravine area as shown on the site map. A west side earthen berm will need to be constructed in order to hold back the sediment. The berm will be seeded to provide eroision control. Silt fences will be installed wherever there is construction activity that could result to soil eroision.

Once the sediment has dried within the basin, the dried sediment will be distributed and spead on the ajoining farm field. The earthen berm will be removed in order to restore the site to its natural drainage pathway. The silt fences shall be removed once vegetation or crops have been restored.

3.3 Method Of Sediment Removal

The construction of the sediment disposal basin and discharge effluent piping will first be constructed. Once the basin is fully built, then the process of hydraulic pumping of the sediment will begin. The proposed method selected to remove the channel sediment is by hydraulic pumping.

3.4 Project Advertisement, Bidding, and Contractor Selection

The project drawings, specifications and contract documents will be prepared to ensure that a reputable, responsible contractor be secured through a competitive open bid process. There will be two contracts, one for the construction of the sediment basin / remedial site restoration and one for the sediment removal / process piping. The project will be leagally advertised in accordance to State Requirements. The contractor shall be selected based on the most responsive, responsible bidder.

Contract bid documents shall include:
Plans
Specifications
Bid proposal
Non-collusion Affidavid
Bid Bond
Payment and Performance Bonds
Form 95A or financial statement
Proof of Insurance
Statements -

- Number of years in the channel dredging business
- Number of completed similar projects
- Check of listed references
- Confirmation of reputation with state agencies
- Types of dredging equipment owned, leased

3.5 Permits

Permits will be prepared by the technical advisor(s) for the Lake Association. They will include the DNR lake shore permit. A Corp of Engineers permit will also be prepared if required.

3.6 Construction Schedule

Pending DNR grant allocation the project could begin construction with the sediment basin in the summer of 2006 and dredging operations beginning late September 2006.

CHAPTER 4 - PRELIMINARY ESTIMATE OF PROBABLE COSTS

The cost estimates for the two channels were derived by figuring the removed sediment in cubic yards and then determining the cost based on the *"Means Construction Cost Data Manual for 2004"* and through other similar area dredging projects.

4.1 Sediment Basin Construction

The estimated cost for constructing the sediment basin and final site remediation is $25,000.

4.2 Stienbarger Channel Dredging

Channel – 700' long x 30' wide	3,150 CYs
Estimate of Probable Cost 3,150 Cys @ $ 10.75 / CY =	**$ 33,800**

4.3 Jones Channel Dredging

Sediment removal would start at the Jones Lake outlet and proceed to a point approximately 300 feet south of the County Road 1050 N. bridge. The remainder of the cannel from that point to Waldron Lake would not be dredged since the average water depth is currently between 4-6 feet deep. The removal width would be 30-feet.

Channel – 800' long x 30' wide	2,900 Cys
Estimate of Probable Cost 2,900 Cys @ $ 10.75 / CY =	**$ 31,200**

4.4 Total Project Costs

Sediment basin	**$ 25,000**
Stienbarger Channel dredging	**$ 33,800**
Waldron Channel dredging	**$ 31,200**
Total project Cost	**$ 90,000**

APPENDIX

A

Report No: F05244-8009
Account No: 91

A & L GREAT LAKES LABORATORIES, INC.

3505 Conestoga Drive • Fort Wayne, Indiana 46808-4414 • Phone 260-483-4759 • FAX 260-483-5274
www.algreatlakes.com • lab@algreatlakes.com

Purchase Order: 082905

To: WEST LAKES CONSERVATION INC.
52772 EMMONS ROAD
SOUTH BEND, IN 46637-4130

Attn: RICK SMIGIELSKI

Lab Number: 95589
Sample ID: JONES OUTLET

BIOSOLIDS ANALYSIS

Date Sampled: 8/28/2005 7:45 AM
Date Received: 09/01/2005
Date Reported: 09/14/2005
Page: 1

Parameter	Wet Basis Result	Wet Basis Unit	DL	Dry Basis Result	Dry Basis Unit	Table 1# mg/kg	Table 3# mg/kg	Loading Rate lbs/Wet ton	Loading Rate lbs/Dry ton	Analyst	Date Analyzed	Method Reference
Nitrogen, Ammonia (as N)	97	mg/kg	1	0.021	%	---	---	0.19	0.43	MG	09/06/05	SM(20th)-4500-NH3B,C
Arsenic	3.934	mg/kg	0.006	8.63	mg/kg	75	41	0.0079	0.017	JAS	09/12/05	SW846-6020
Cadmium	<0.006	mg/kg	0.006	<0.013	mg/kg	85	39	<0.0000	<0.00003	JAS	09/12/05	SW846-6020
Copper	5.897	mg/kg	0.006	12.9	mg/kg	4300	1500	0.012	0.026	JAS	09/12/05	SW846-6020
Lead	5.954	mg/kg	0.008	13.1	mg/kg	840	300	0.012	0.026	JAS	09/12/05	SW846-6020
Mercury	<0.001	mg/kg	0.001	<0.0022	mg/kg	57	17	<0.0000	<0.00000	JAS	09/12/05	SW846-6020
Selenium	1.436	mg/kg	0.015	3.15	mg/kg	100	100	0.0029	0.0063	JAS	09/12/05	SW846-6020
Zinc	21.952	mg/kg	0.012	48.2	mg/kg	7500	2800	0.044	0.096	JAS	09/12/05	SW846-6020
Solids, Total	45.56	%	0.01	100.0	%	---	---	911.1	2000.0	MG	09/01/05	EPA-160.3
Chromium	2.373	mg/kg	0.010	5.21	mg/kg	---	---	0.0047	0.010	JAS	09/12/05	SW846-6020
Silver	<1.0	mg/kg	1.0	<2.2	mg/kg	---	---	<0.002	<0.0044	JAS	09/12/05	SW846-6010B
Barium	34.9	mg/kg	1.0	76.6	mg/kg	---	---	0.070	0.15	JAS	09/12/05	SW846-6010B
Sample Digestion-Microwave						---	---			DLG	09/08/05	SW846-3051

Table 1 and Table 3 pollution concentrations for biosolids or industrial waste products, EPA-600/4-79-020, 327 IAC 6.1-5.

Biosolid

Report No: F05244-8009
Account No: 91

A & L GREAT LAKES LABORATORIES, INC.

3505 Conestoga Drive • Fort Wayne, Indiana 46808-4414 • Phone 260-483-4759 • FAX 260-483-5274
www.algreatlakes.com • lab@algreatlakes.com

Purchase Order: 082905

To: WEST LAKES CONSERVATION INC.
52772 EMMONS ROAD
SOUTH BEND, IN 46637-4130

Attn: RICK SMIGIELSKI

Lab Number: 95588
Sample ID: STIEN

BIOSOLIDS ANALYSIS

Date Sampled: 8/28/2005 8:00 AM
Date Received: 09/01/2005
Date Reported: 09/14/2005

Nitrogen, Ammonia (as N)	29	mg/kg	1	0.0068	%	---	---	0.058	0.14	MG	09/06/05	SM(20th)-4500-NH3B,C
Arsenic	2.724	mg/kg	0.006	6.35	mg/kg	75	41	0.0054	0.013	JAS	09/12/05	SW846-6020
Cadmium	0.428	mg/kg	0.006	1.00	mg/kg	85	39	0.00086	0.0020	JAS	09/12/05	SW846-6020
Copper	5.086	mg/kg	0.006	11.9	mg/kg	4300	1500	0.010	0.024	JAS	09/12/05	SW846-6020
Lead	3.914	mg/kg	0.008	9.13	mg/kg	840	300	0.0078	0.018	JAS	09/12/05	SW846-6020
Mercury	<0.001	mg/kg	0.001	<0.0023	mg/kg	57	17	<0.0000	<0.00000	JAS	09/12/05	SW846-6020
Selenium	1.174	mg/kg	0.015	2.74	mg/kg	100	100	0.0023	0.0055	JAS	09/12/05	SW846-6020
Zinc	17.338	mg/kg	0.012	40.4	mg/kg	7500	2800	0.035	0.081	JAS	09/12/05	SW846-6020
Solids, Total	42.87	%	0.01	100.0	%	---	---	857.5	2000.0	MG	09/01/05	EPA-160.3
Chromium	1.585	mg/kg	0.010	3.70	mg/kg	---	---	0.0032	0.0074	JAS	09/12/05	SW846-6020
Silver	<1.0	mg/kg	1.0	<2.3	mg/kg	---	---	<0.002	<0.0047	JAS	09/12/05	SW846-6010B
Barium	58.4	mg/kg	1.0	136	mg/kg	---	---	0.12	0.27	JAS	09/12/05	SW846-6010B
Sample Digestion-Microwave						---	---			DLG	09/08/05	SW846-3051

Table 1 and Table 3 pollution concentrations for biosolids or industrial waste products, EPA-600/4-79-020, 327 IAC 6.1-5.

Biosolid

APPENDIX

B

WEST LAKES CONSERVATION, INC.
0781 East Willow Lane
Wawaka, Indiana 46794

This letter of intent is for the purpose of the West Lakes Conservation, Inc. to utilize a site on Mr. Joseph Whetstone's property for the use of constructing a sediment storage basin of which will be use to capture channel sediment from the West Lakes dredging activities.

The area of the sediment basin is noted on the attached map.

The West Lakes Conservation, Inc agrees to spread the dried sediment over Mr. Whetstones' farm field as part of the final remediation plan or to leave in place per Mr. Whetstones choosing.

The newly constructed west berm of the basin shall be removed to provide site drainage as per the original site contours.

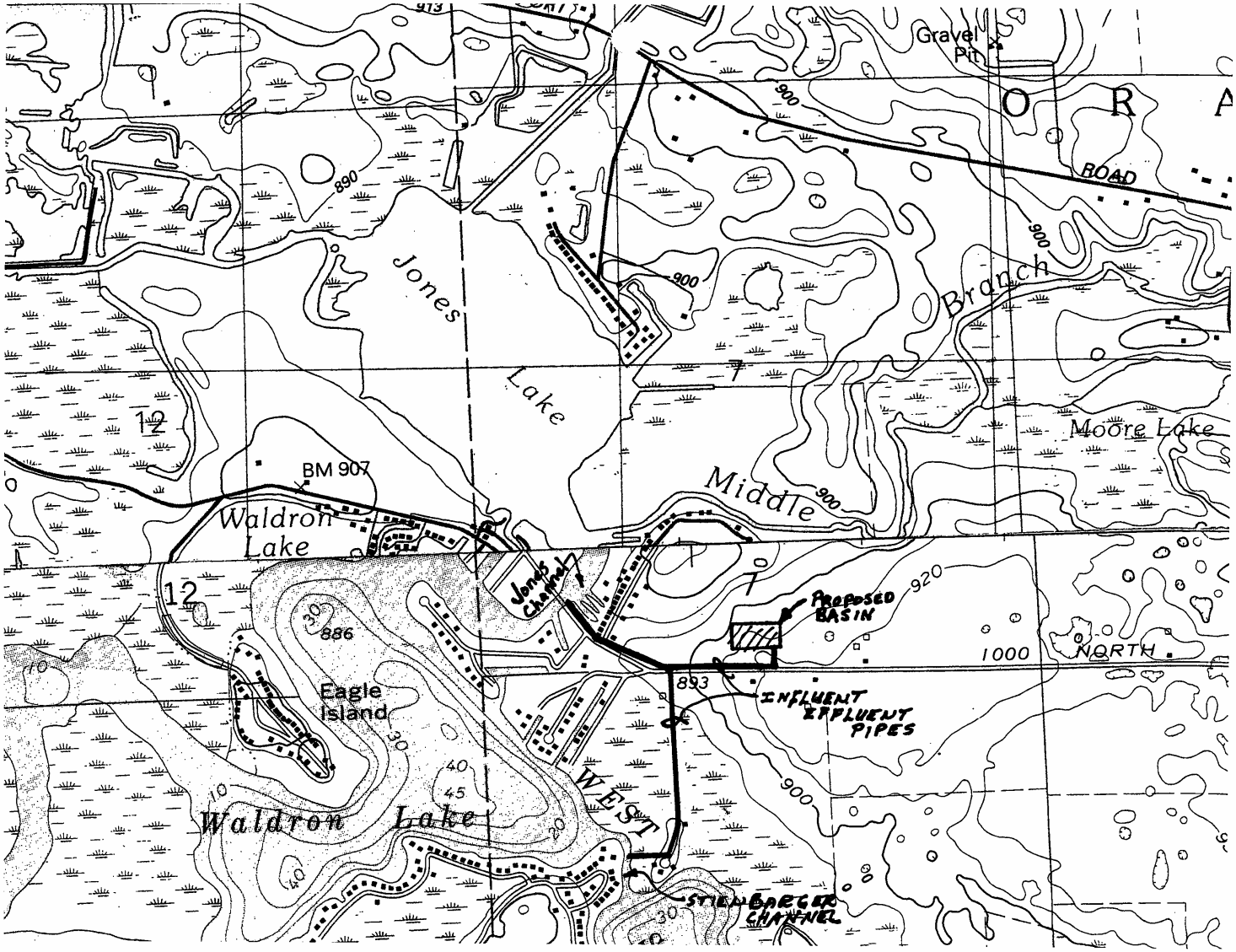
This agreement made this 23rd day of September 2005.

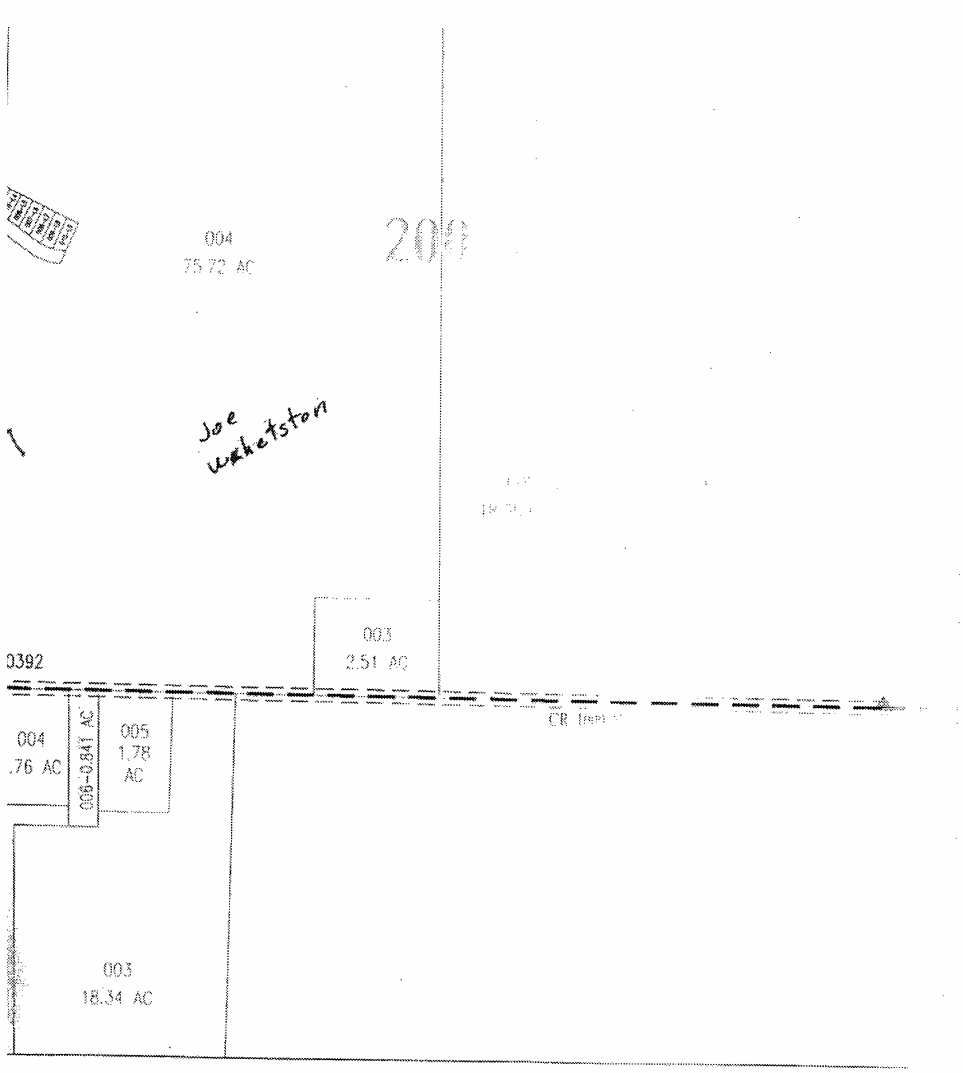
Mr. Joseph Whetstone
Property Owner

Mr. David Wick
President WLC, Inc

APPENDIX

C


Gravel Pit
ROAD
Jones Lake
Branch
Moore Lake
Middle
BM 907
Waldron Lake
Jones Channel
PROPOSED BASIN
1000
NORTH
893
INFLUENT
EFFLUENT
PIPES
Eagle Island
886
WEST
Waldron Lake
STIELLBARGER CHANNEL
12
900
890
920
30
40
45
10



N

TOWNSHIP REFERENCE GUIDE

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7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

COUNTY REFERENCE GUIDE

	R 8 E	R 9 E	R 10 E	R 11 E
T 35 N	PERRY	ELKHART	ORANGE	WAYNE
T 34 N	SPARTA	YORK	JEFFERSON	ALLEN
T 33 N	WASHINGTON	NOBLE	GREEN	SWAN

Printed by the Noble County

Compiled from 1993 aerial photography of 1927. Blue dashed lines represent and/or tiles or natural watercourses. Re represent parcels without known land locations and dimensions are based on surveys obtained from county records representation of land ownership within intended for informational use only. Surveyor's Office and all other County preparation of this map accept no re information is used.

APPENDIX

D

WEST LAKES
CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by
Rick Smigielski 574-250-2538

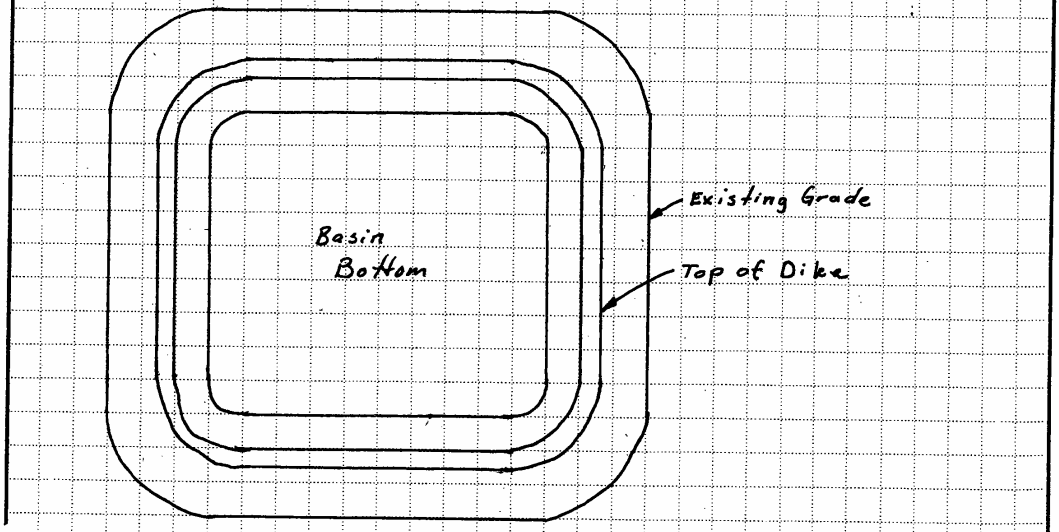
JOB West Lakes Inc.
SHEET NO. 1 OF 1
CALCULATED BY RMS DATE 9-22-2005
CHECKED BY _____ DATE _____
SCALE _____

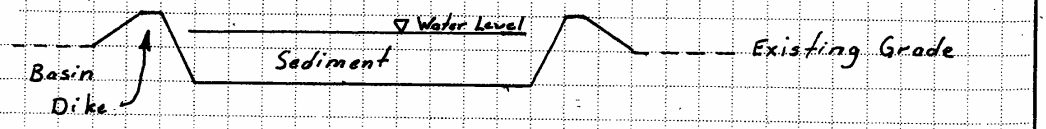
BASIN SIZING FOR STEINBARGER & JONES

Steinbarger Channel 3100 CYs
Jones Channel 2900 CYs
: TOTAL SEDIMENT 6,000 CYs x 1.3 = 7,800 CYs

Basin Area Requirements based on 210,600 CF

@ 2' Deep = 324' x 324' ± 2.5 acres
@ 3' Deep = 265' x 265' ± 1.6 acres
@ 4' Deep = 230' x 230' ± 1 acre





APPENDIX

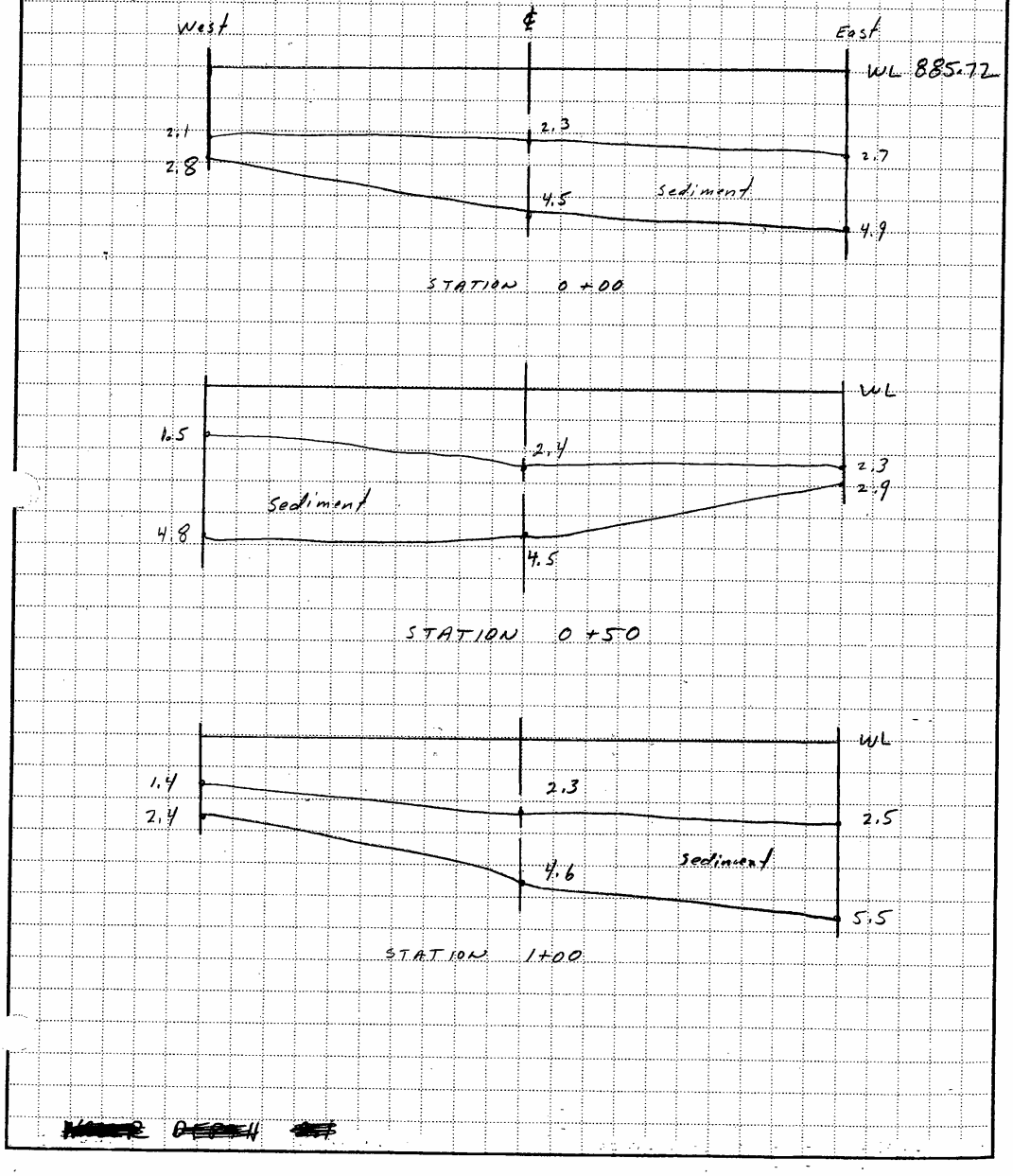
E

WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by Rick Smigielski 574-250-2538

JOB STEINBARGER CHANNEL
SHEET NO. 1-S OF 9
CALCULATED BY RMS DATE 7/11/2005
CHECKED BY _____ DATE _____
SCALE _____

WL= 887.82 - 2.10 = 885.72

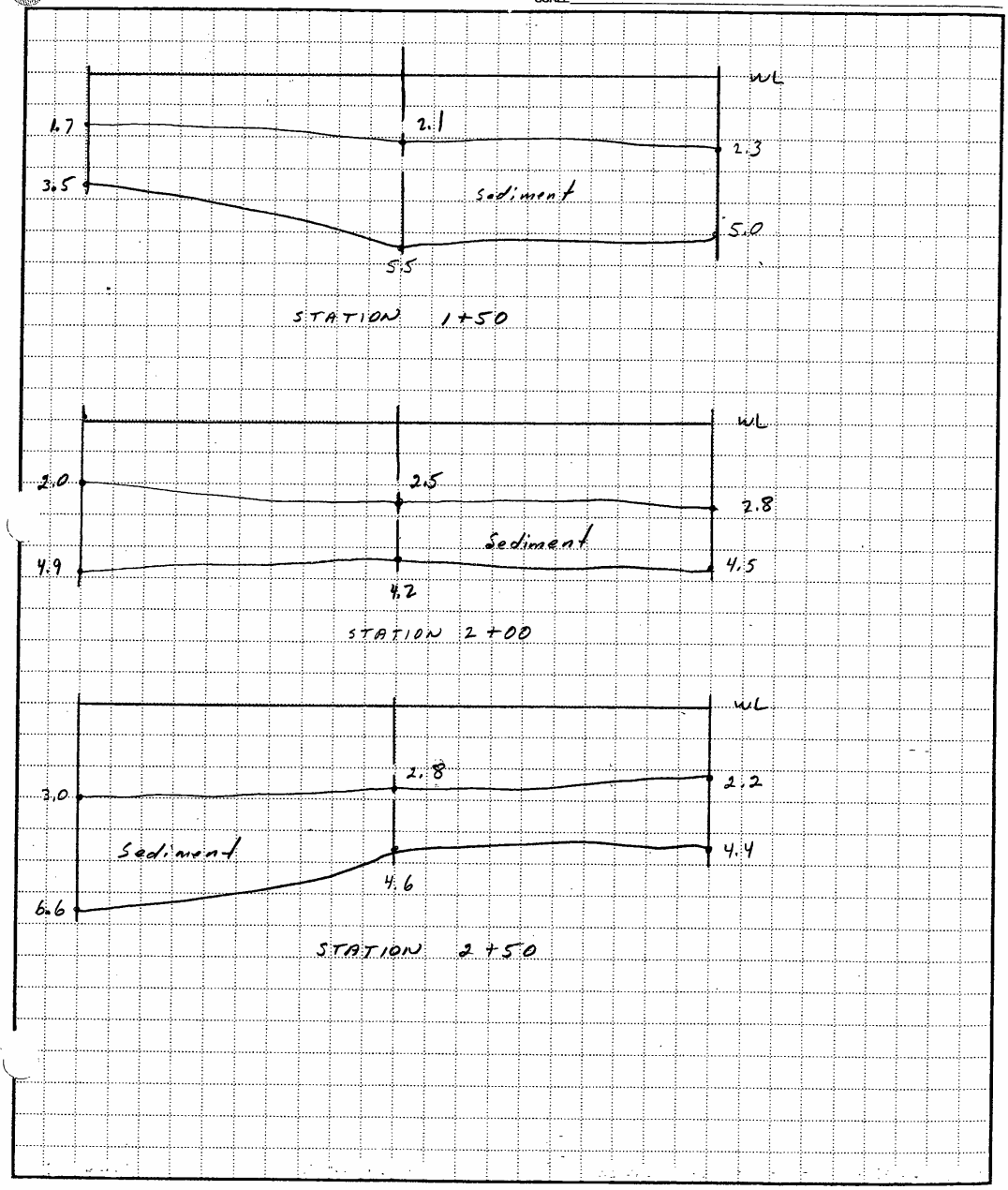


~~MARKER DEPTH REF~~

WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by
Rick Smigielski 574-250-2538

JOB Steinbarger Channel
SHEET NO. 2-S OF 9
CALCULATED BY RMS DATE 7/11/2005
CHECKED BY _____ DATE _____
SCALE _____



WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by Rick Smigielski 574-250-2538

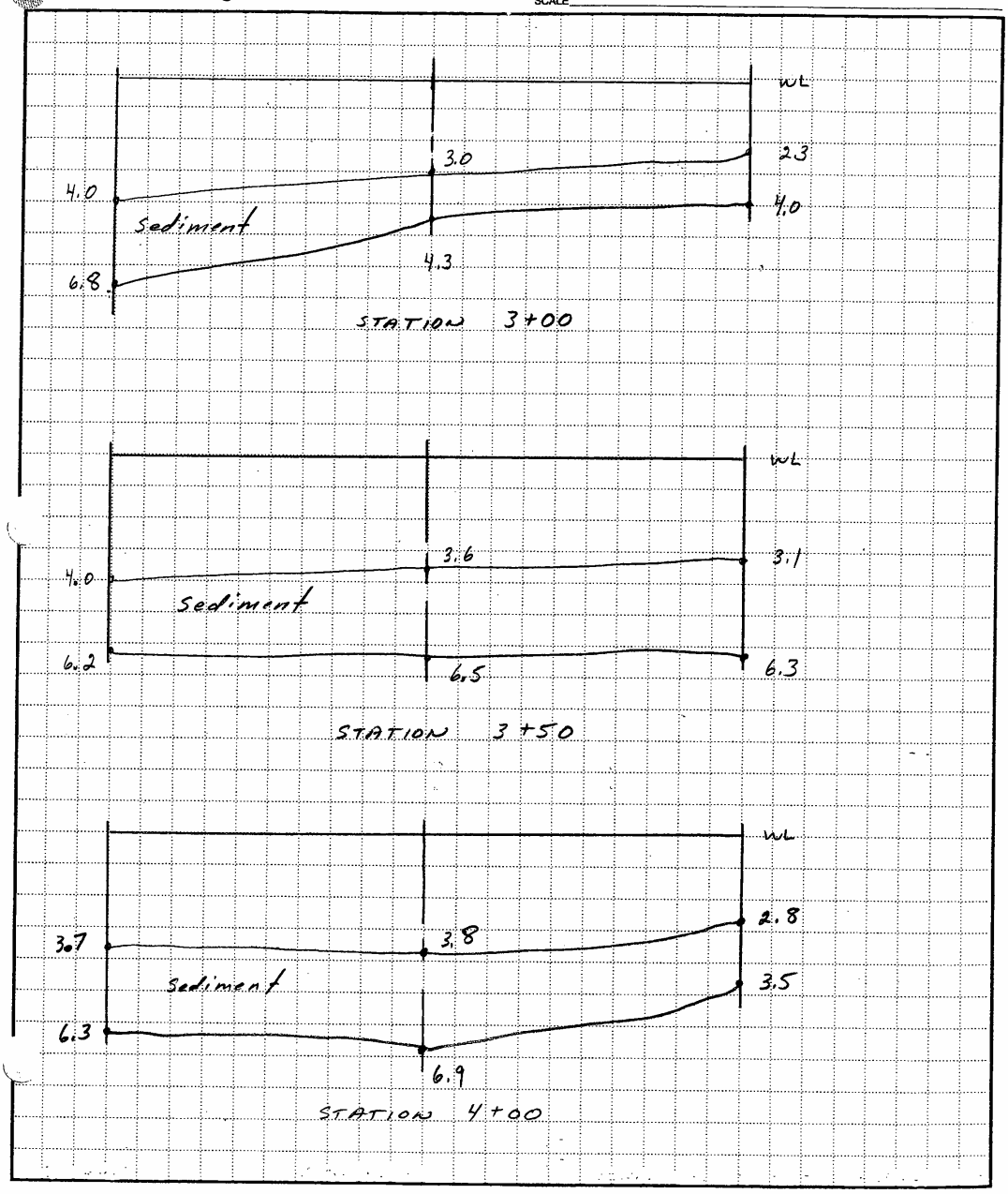
JOB Steinberger Channel

SHEET NO. 3-S OF 9

CALCULATED BY _____ DATE 7/11/2005

CHECKED BY _____ DATE _____

SCALE _____



WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by Rick Smigielski 574-250-2538

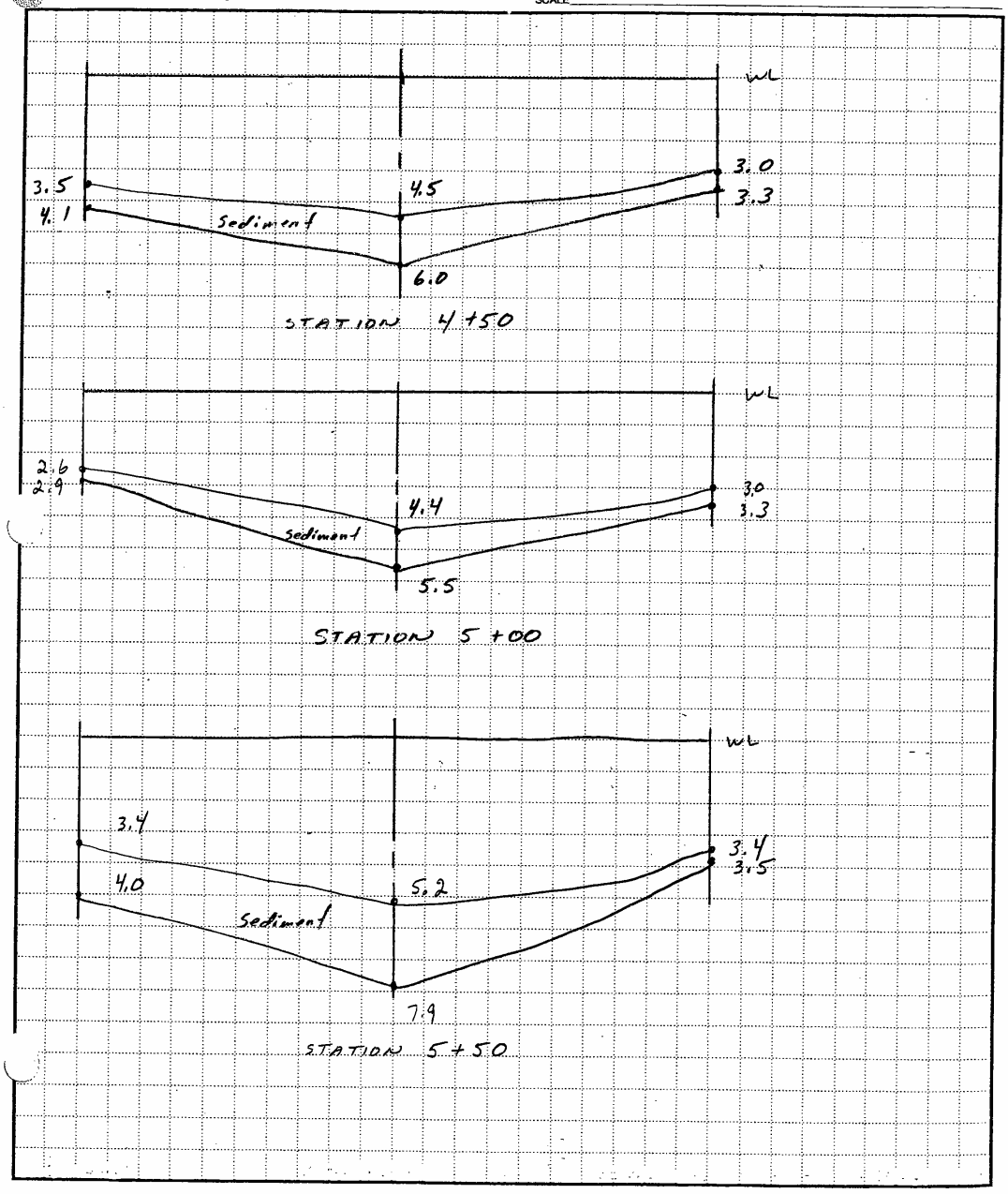
JOB Steinberger Channel

SHEET NO. 4-5 OF 9

CALCULATED BY _____ DATE 7/11/2005

CHECKED BY _____ DATE _____

SCALE _____



WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by Rick Smigielski 574-250-2538

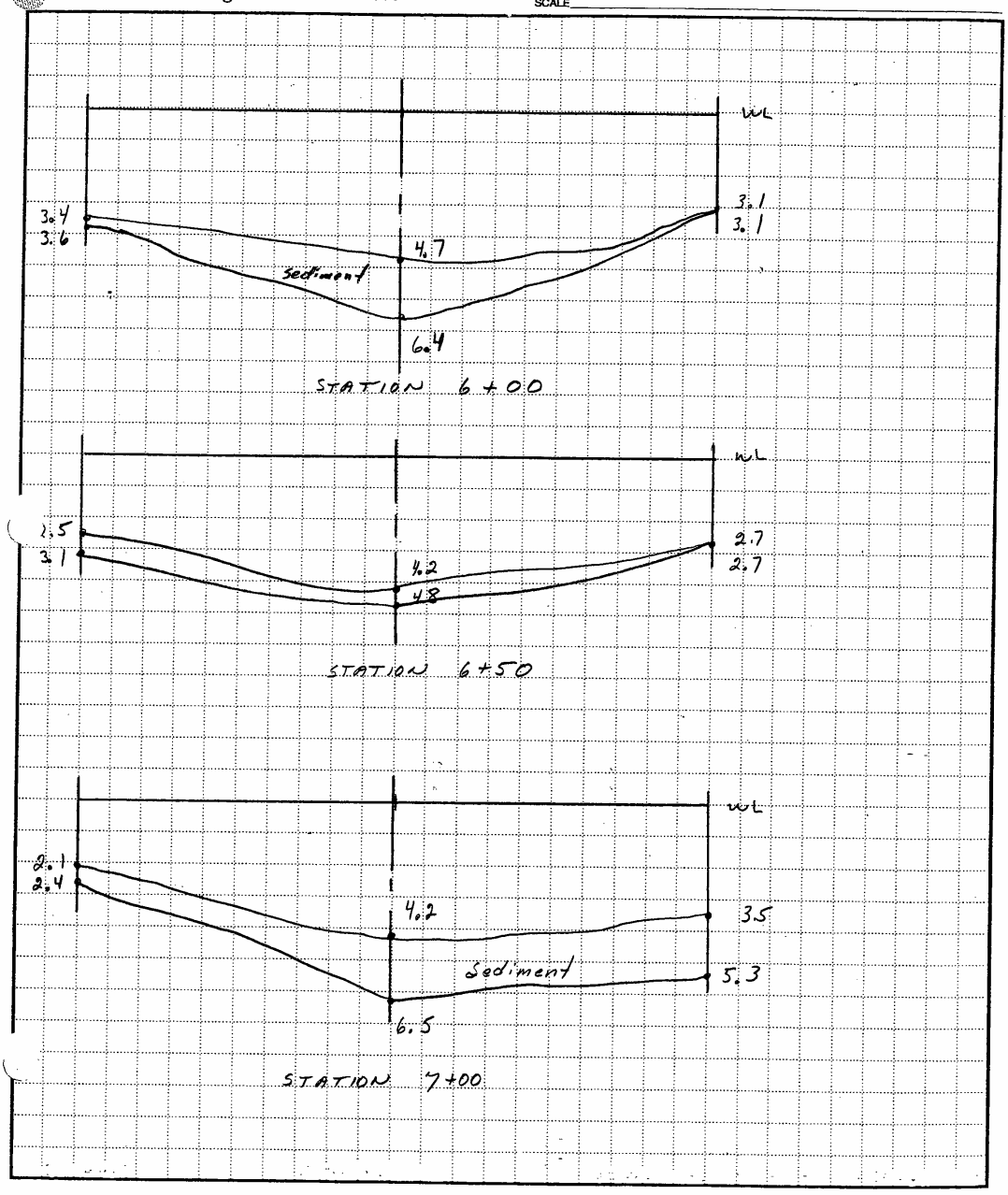
JOB Stickenbarger Channel

SHEET NO. 5-5 OF 9

CALCULATED BY _____ DATE 7/11/2005

CHECKED BY _____ DATE _____

SCALE _____



WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by Rick Smigielski 574-250-2538

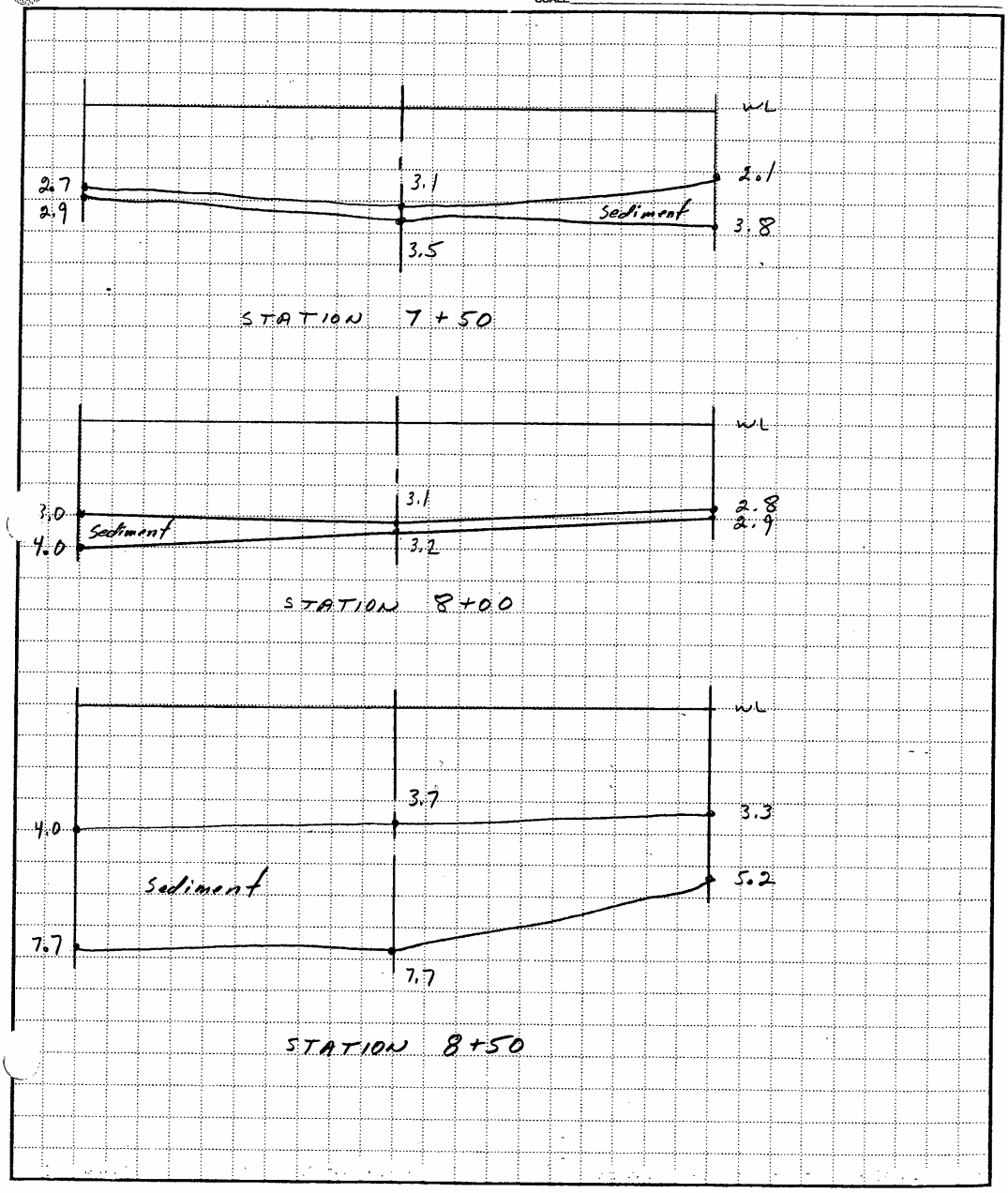
JOB Steinbarger Channel

SHEET NO. 6 - S OF 9

CALCULATED BY _____ DATE 7/11/2005

CHECKED BY _____ DATE _____

SCALE _____



WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by Rick Smigielski 574-250-2538

JOB STEINBARGER CHANNEL

SHEET NO. 7-5 OF 9

CALCULATED BY RMS DATE 8-12-2005

CHECKED BY _____ DATE _____

SCALE _____

STAT 0+00 $\left[\frac{(2.8-2.1)+(4.5-2.3)}{2}\times 25\right] + \left[\frac{(4.5-2.3)+(4.9-2.7)}{2}\times 25\right] = 80$ SF

0+50 $\left[\frac{(4.8-1.5)+(4.5-2.4)}{2}\times 25\right] + \left[\frac{(4.5-2.4)+(2.9-2.3)}{2}\times 25\right] = 102$

1+00 $\left[\frac{(2.4-1.4)+(4.6-2.3)}{2}\times 25\right] + \left[\frac{(4.6-2.3)+(5.5-2.5)}{2}\times 25\right] = 107$

1+50 $\left[\frac{(3.5-1.7)+(5.5-2.1)}{2}\times 25\right] + \left[\frac{(5.5-2.1)+(5.0-2.3)}{2}\times 25\right] = 141$

2+00 $\left[\frac{(4.9-2.0)+(4.2-2.5)}{2}\times 25\right] + \left[\frac{(4.2-2.5)+(4.5-2.8)}{2}\times 25\right] = 101$

2+50 $\left[\frac{(6.6-3.0)+(4.6-2.8)}{2}\times 25\right] + \left[\frac{(4.6-2.8)+(4.4-2.2)}{2}\times 25\right] = 118$

3+00 $\left[\frac{(6.8-4.0)+(4.3-3.0)}{2}\times 25\right] + \left[\frac{(4.3-3.0)+(4.0-2.3)}{2}\times 25\right] = 89$

3+50 $\left[\frac{(6.2-4.0)+(6.5-3.6)}{2}\times 25\right] + \left[\frac{(6.5-3.6)+(6.3-3.1)}{2}\times 25\right] = 140$

4+00 $\left[\frac{(6.3-3.7)+(6.9-3.8)}{2}\times 25\right] + \left[\frac{(6.9-3.8)+(3.5-2.8)}{2}\times 25\right] = 119$

4+50 $\left[\frac{(4.1-3.5)+(6.0-4.5)}{2}\times 25\right] + \left[\frac{(6.0-4.5)+(3.3-3.0)}{2}\times 25\right] = 49$

5+00 $\left[\frac{(2.9-2.6)+(5.5-4.4)}{2}\times 25\right] + \left[\frac{(5.5-4.4)+(3.3-3.0)}{2}\times 25\right] = 36$

WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by
Rick Smigielski 574-250-2538

JOB STEINBARGER CHANNEL
SHEET NO. 8-5 OF 9
CALCULATED BY _____ DATE 8-12-2005
CHECKED BY _____ DATE _____
SCALE _____

STAT 5+50 $\left[\frac{(4.0-3.4)+(7.9-5.2)}{2}\times 25\right]+\left[\frac{(7.9-5.2)+(3.5-3.4)}{2}\times 25\right]=76$

6+00 $\left[\frac{(3.6-3.4)+(6.4-4.7)}{2}\times 25\right]+\left[\frac{(6.4-4.7)+(3.1-3.1)}{2}\times 25\right]=45$

6+50 $\left[\frac{(3.1-2.5)+(4.8-4.2)}{2}\times 25\right]+\left[\frac{(4.8-4.2)+(2.7-2.7)}{2}\times 25\right]=23$

7+00 $\left[\frac{(2.4-2.1)+(6.5-4.2)}{2}\times 25\right]+\left[\frac{(6.5-4.2)+(5.3-3.5)}{2}\times 25\right]=84$

7+50 $\left[\frac{(2.9-2.7)+(3.5-3.1)}{2}\times 25\right]+\left[\frac{(3.5-3.1)+(3.8-2.1)}{2}\times 25\right]=35$

8+00 $\left[\frac{(4.0-3.0)+(3.2-3.1)}{2}\times 25\right]+\left[\frac{(3.2-3.1)+(2.9-2.8)}{2}\times 25\right]=17$

8+50 $\left[\frac{(7.7-4.0)+(7.7-3.7)}{2}\times 25\right]+\left[\frac{(7.7-3.7)+(5.2-3.3)}{2}\times 25\right]=171$

WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by
Rick Smigielski 574-250-2538

JOB Steinbarger Channel
SHEET NO. 9-S OF 9
CALCULATED BY BmB DATE 8-12-2005
CHECKED BY _____ DATE _____
SCALE _____

0+00	to	0+50	-	(80	+ 102)	/2	x 50 =	4550
0+50	to	1+00	-	(102	+ 107)	/2	x 50 =	5225
1+00	to	1+50	-	(107	+ 141)	/2	x 50 =	6200
1+50	to	2+00	-	(141	+ 101)	/2	x 50 =	6050
2+00	to	2+50	-	(101	+ 118)	/2	x 50 =	5475
2+50	to	3+00	-	(118	+ 89)	/2	x 50 =	5175
3+00	to	3+50	-	(89	+ 140)	/2	x 50 =	5725
3+50	to	4+00	-	(140	+ 119)	/2	x 50 =	6475
4+00	to	4+50	-	(119	+ 49)	/2	x 50 =	4200
4+50	to	5+00	-	(49	+ 36)	/2	x 50 =	2125
5+00	to	5+50	-	(36	+ 76)	/2	x 50 =	2800
5+50	to	6+00	-	(76	+ 45)	/2	x 50 =	3025
6+00	to	6+50	-	(45	+ 23)	/2	x 50 =	1700
6+50	to	7+00	-	(23	+ 84)	/2	x 50 =	2675
7+00	to	7+50	-	(84	+ 35)	/2	x 50 =	2975
7+50	to	8+00	-	(35	+ 17)	/2	x 50 =	1300
8+00	to	8+50	-	(17	+ 171)	/2	x 50 =	4700

TOTAL CUBIC FEET / CUBIC YARDS 70,375 CF / 2606 CY

2606 CY x 1.15 expansion x 1.05 turn = 3150 CYo

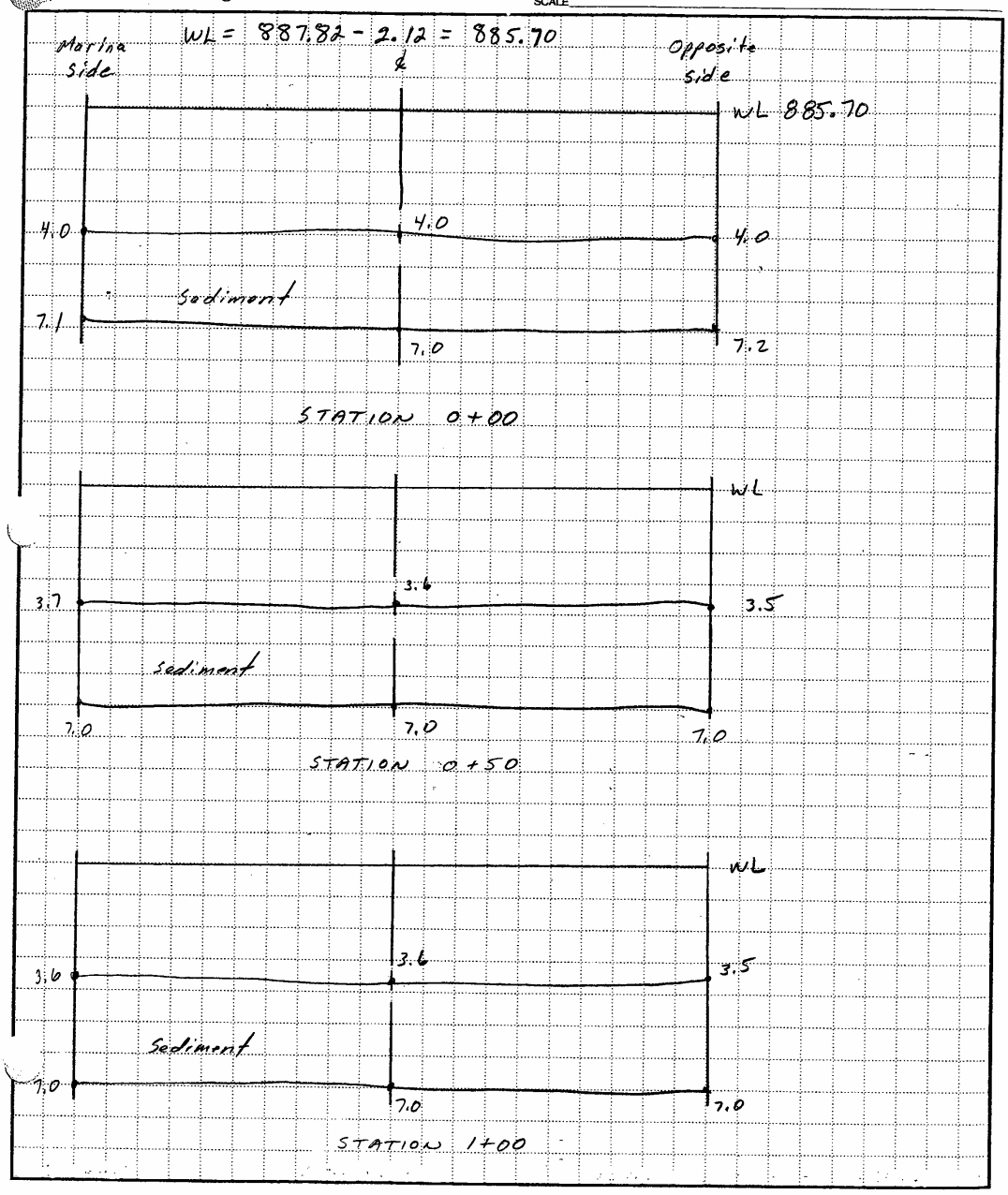
APPENDIX

F

WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by Rick Smigielski 574-250-2538

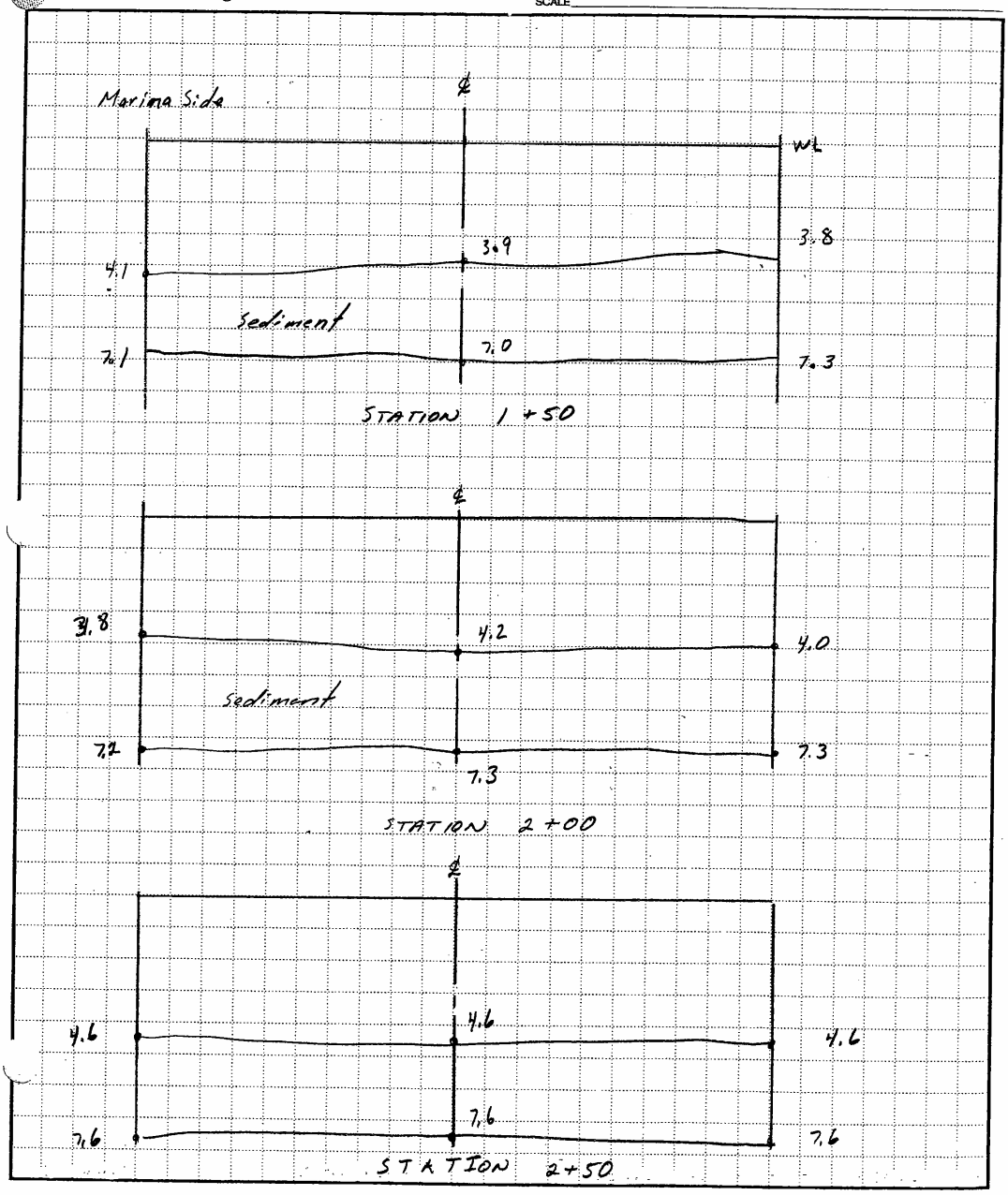
JOB JONES CHANNEL
SHEET NO. 1-J OF 25
CALCULATED BY RMS DATE 7-11-2005
CHECKED BY _____ DATE _____
SCALE _____



WEST LAKES
CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by Rick Smigielski 574-250-2538

JOB Jones Channel
SHEET NO. 2-W OF 25
CALCULATED BY _____ DATE 8-8-2005
CHECKED BY _____ DATE _____
SCALE _____



WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by Rick Smigielski 574-250-2538

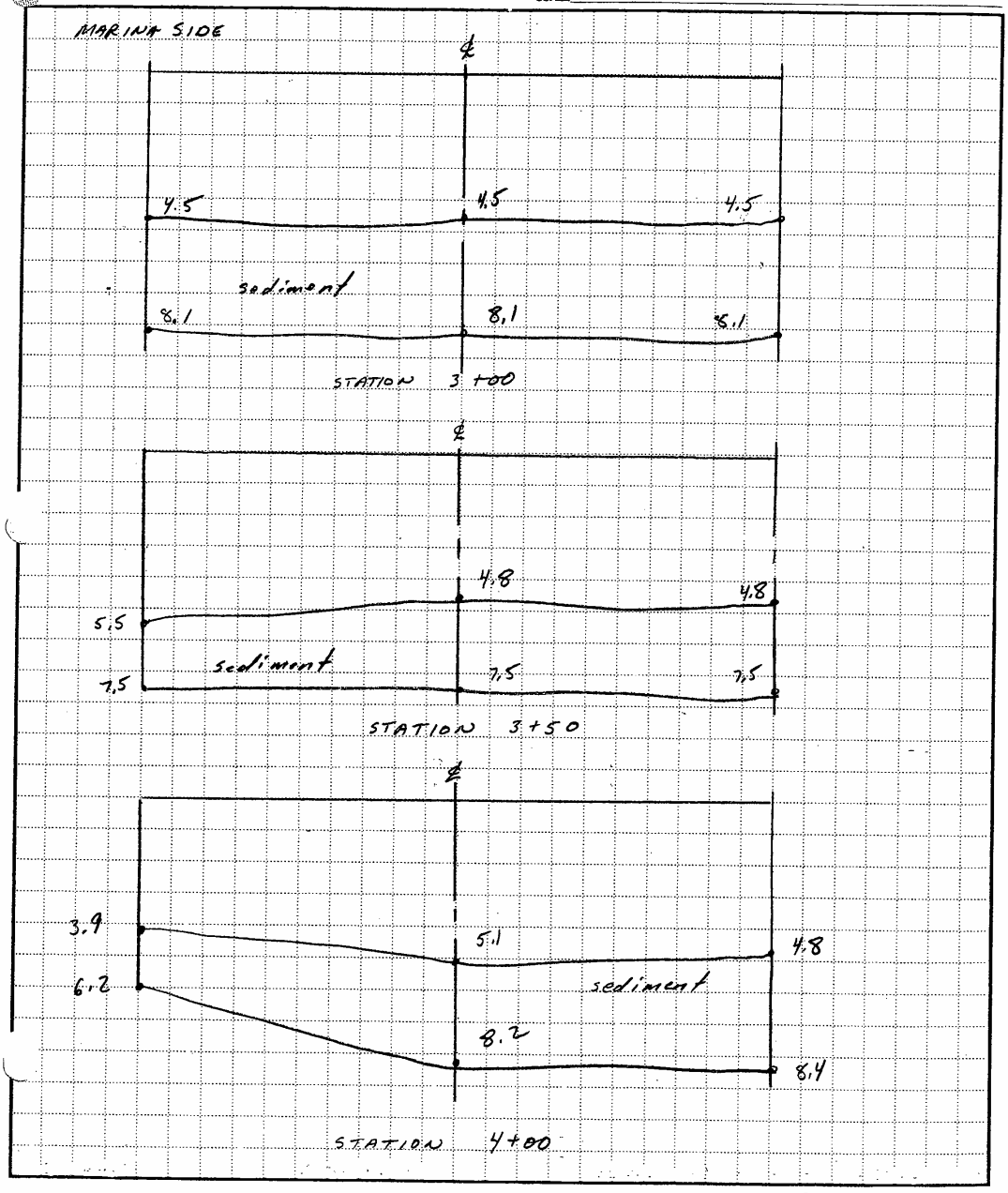
JOB Jones Channel

SHEET NO. 3-J OF 25

CALCULATED BY _____ DATE 8-8-2005

CHECKED BY _____ DATE _____

SCALE _____



WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by Rick Smigielski 574-250-2538

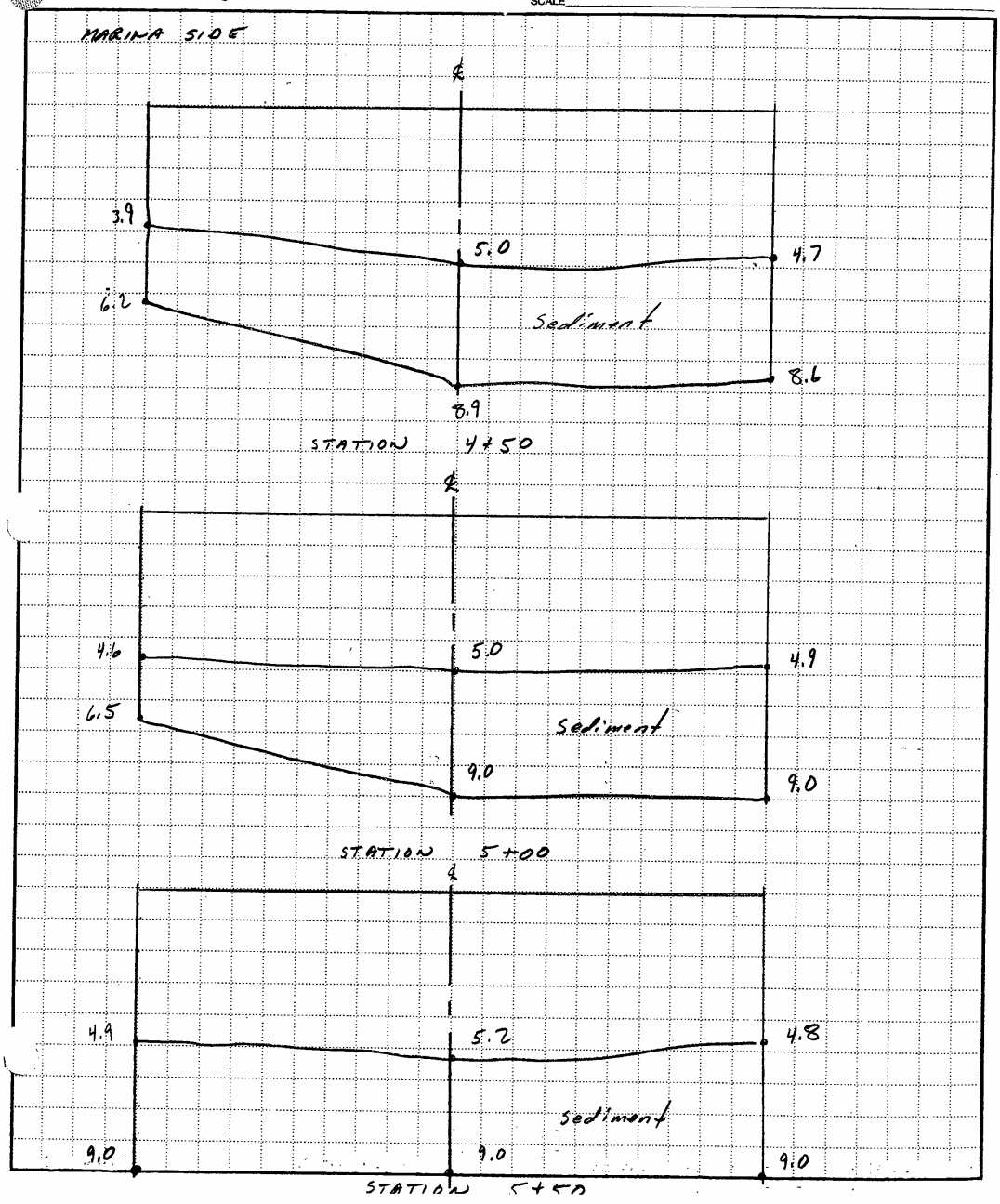
JOB Jones Channel

SHEET NO. 4-d OF 25

CALCULATED BY _____ DATE 8-8-2005

CHECKED BY _____ DATE _____

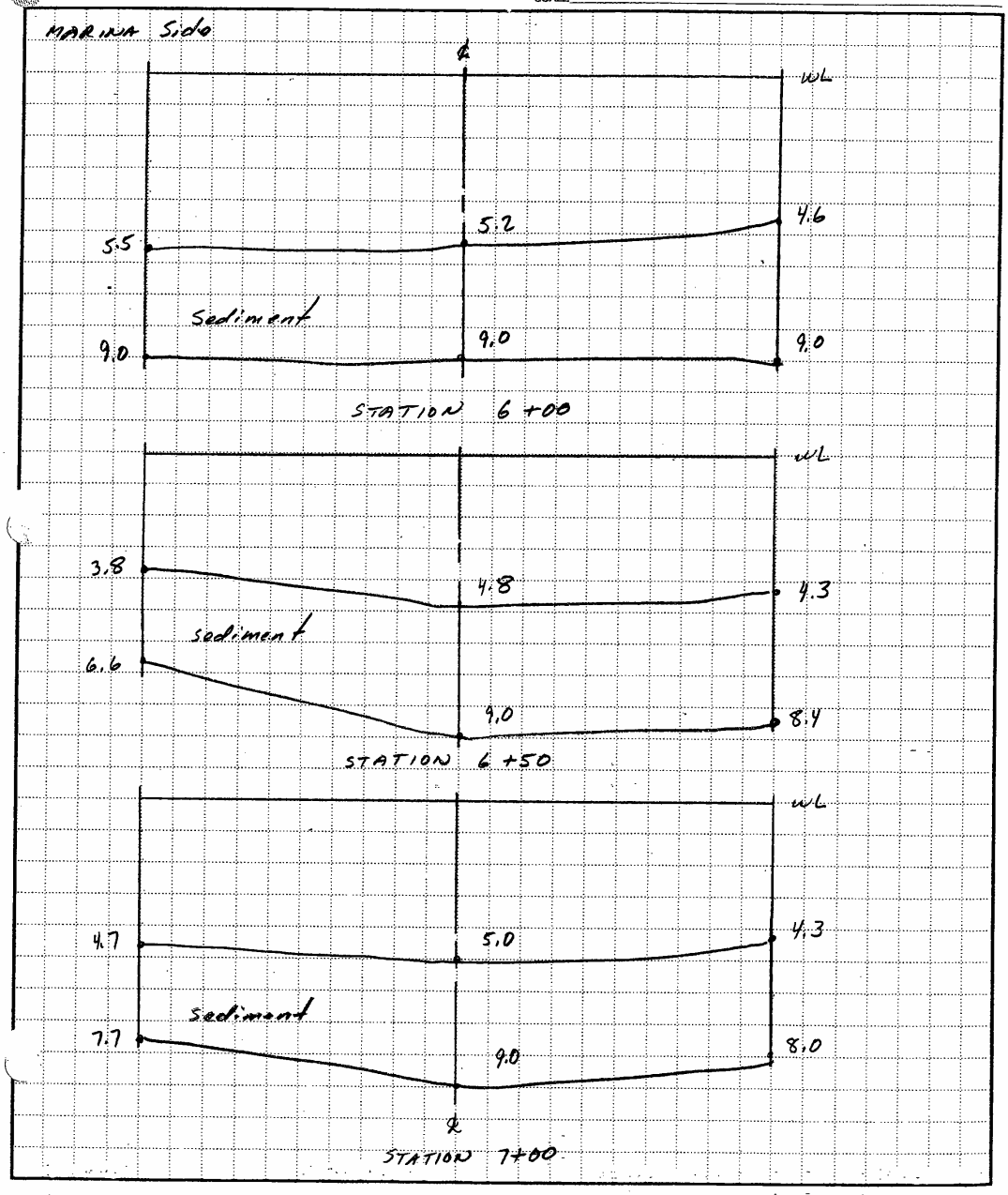
SCALE _____



WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by
Rick Smigielski 574-250-2538

JOB Jones Channel
SHEET NO. 5-J OF 25
CALCULATED BY _____ DATE 8-8-2005
CHECKED BY _____ DATE _____
SCALE _____



WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by Rick Smigielski 574-250-2538

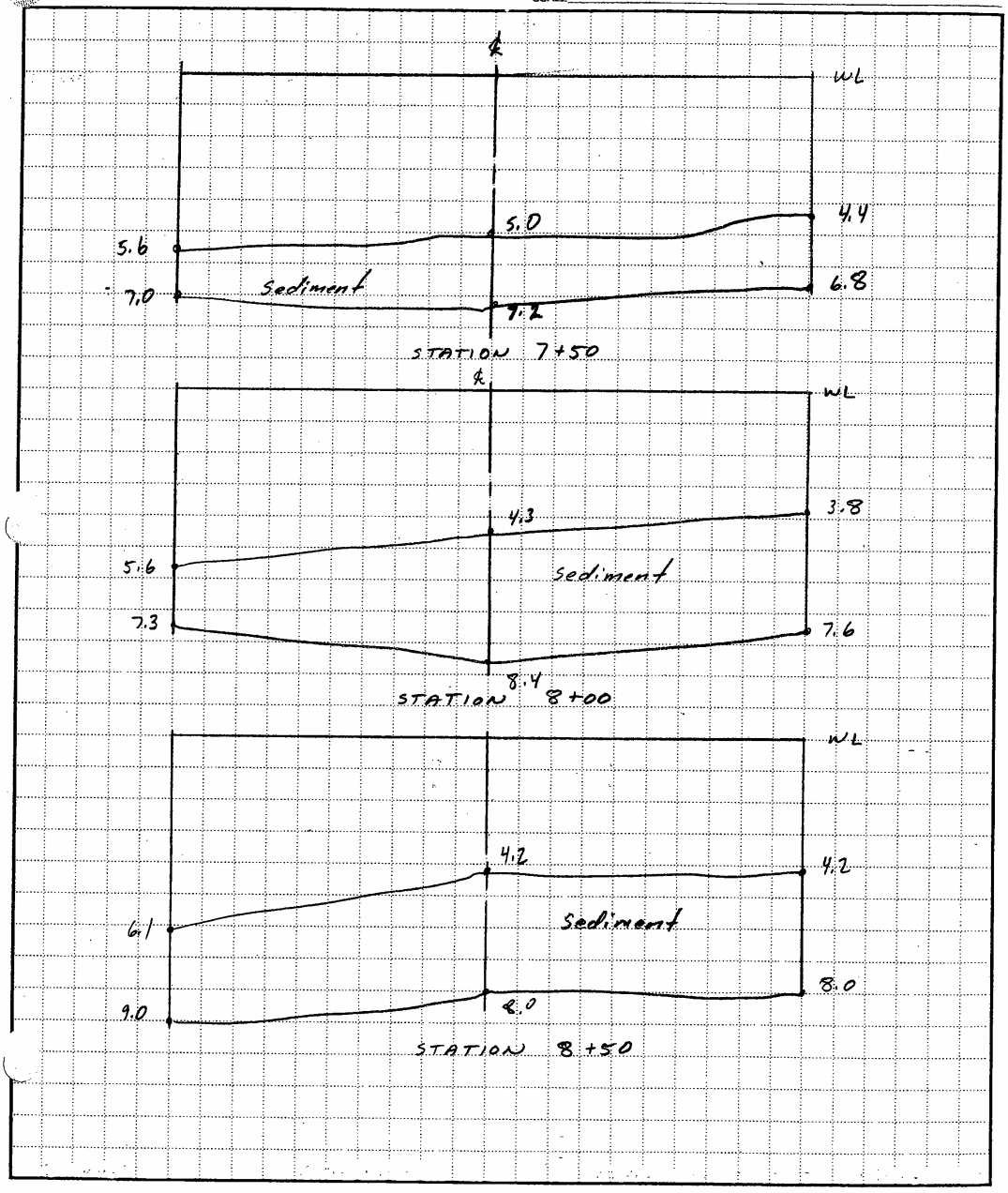
JOB Jones Channel

SHEET NO. 6-d OF 25

CALCULATED BY _____ DATE 8-8-2005

CHECKED BY _____ DATE _____

SCALE _____



WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by Rick Smigielski 574-250-2538

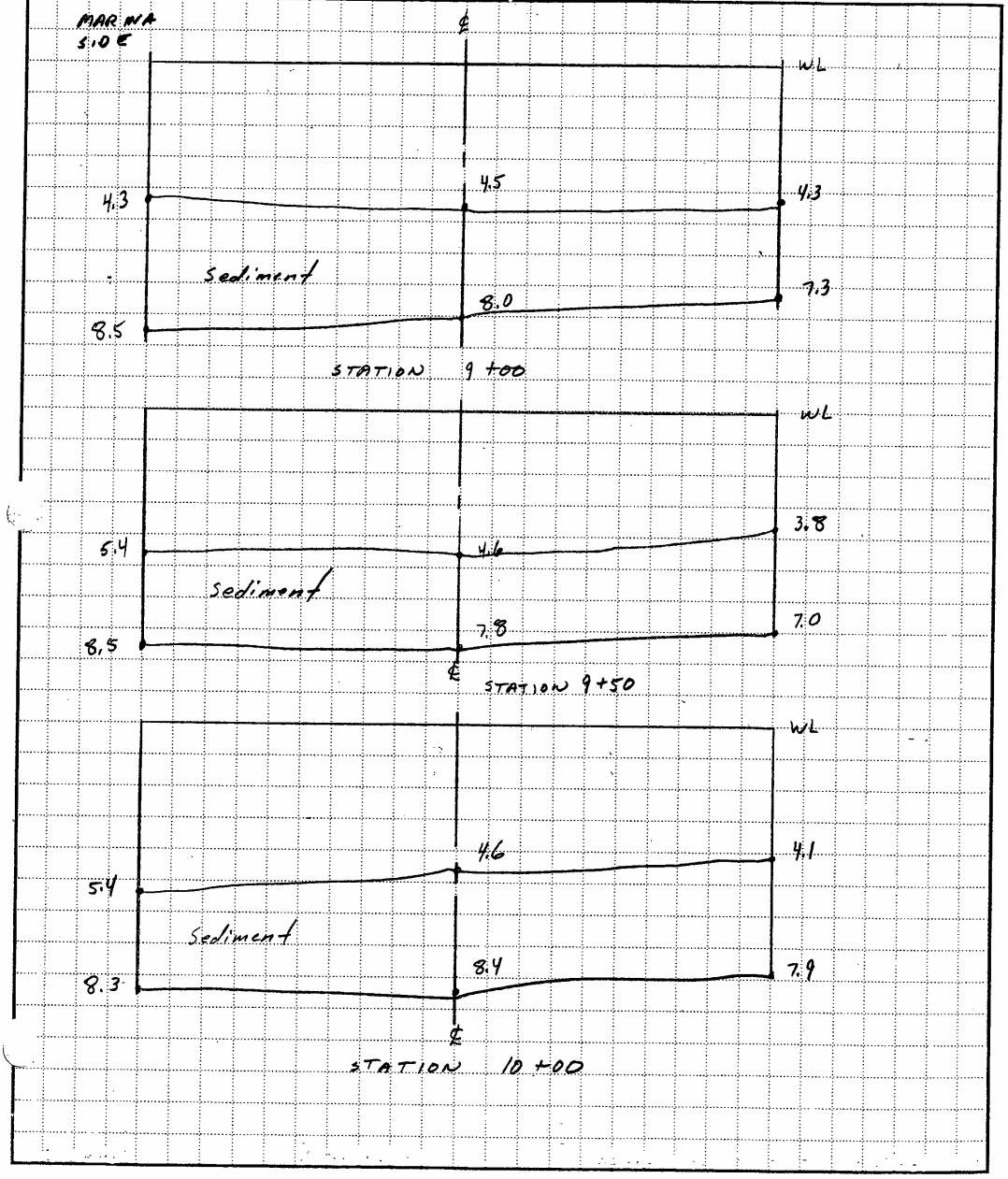
JOB Jones Channel

SHEET NO. 7-1 OF 25

CALCULATED BY _____ DATE 8-8-2005

CHECKED BY _____ DATE _____

SCALE _____



WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by Rick Smigielski 574-250-2538

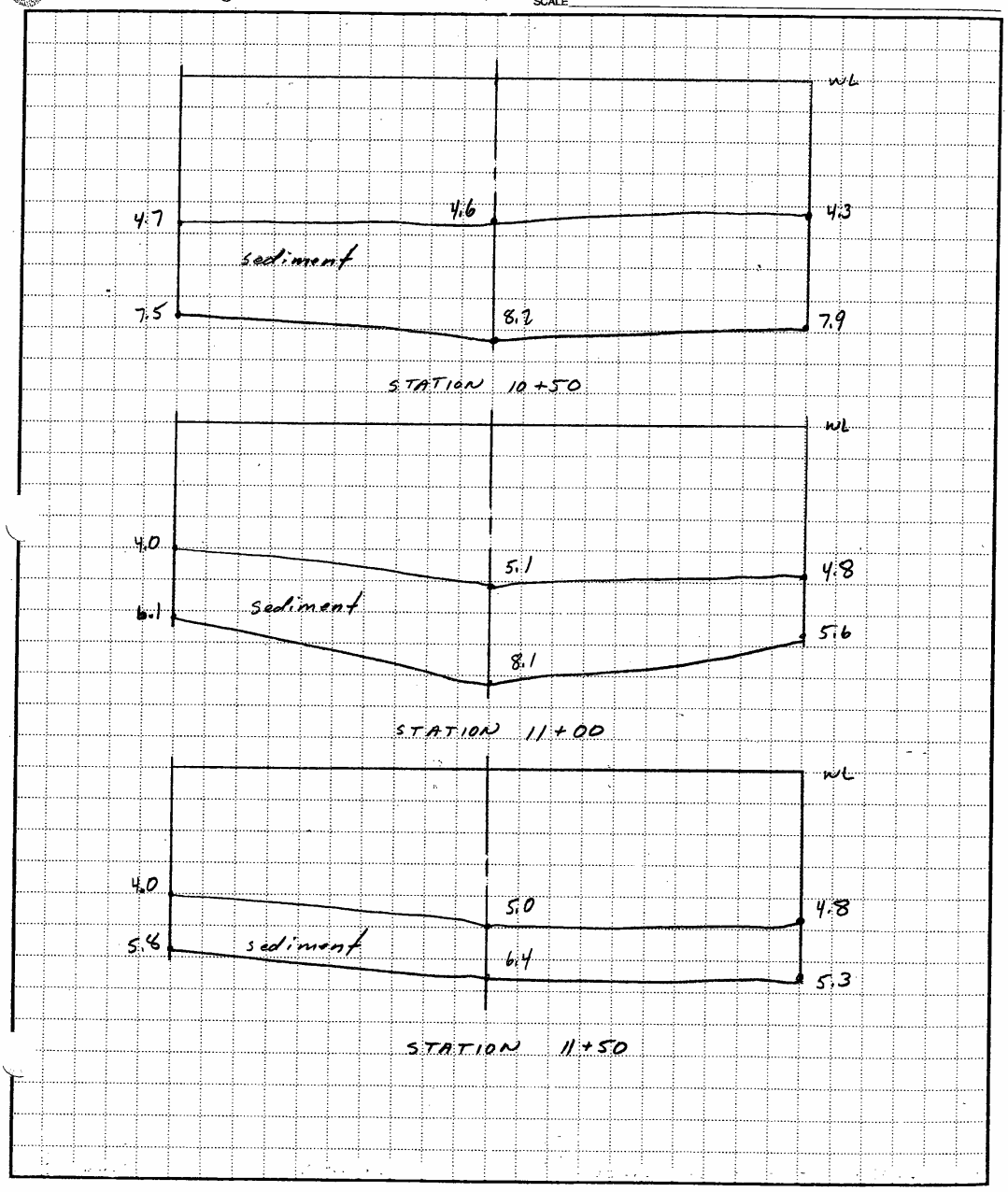
JOB Jones Channel

SHEET NO. 8 of 25 OF 25

CALCULATED BY _____ DATE 8-8-2005

CHECKED BY _____ DATE _____

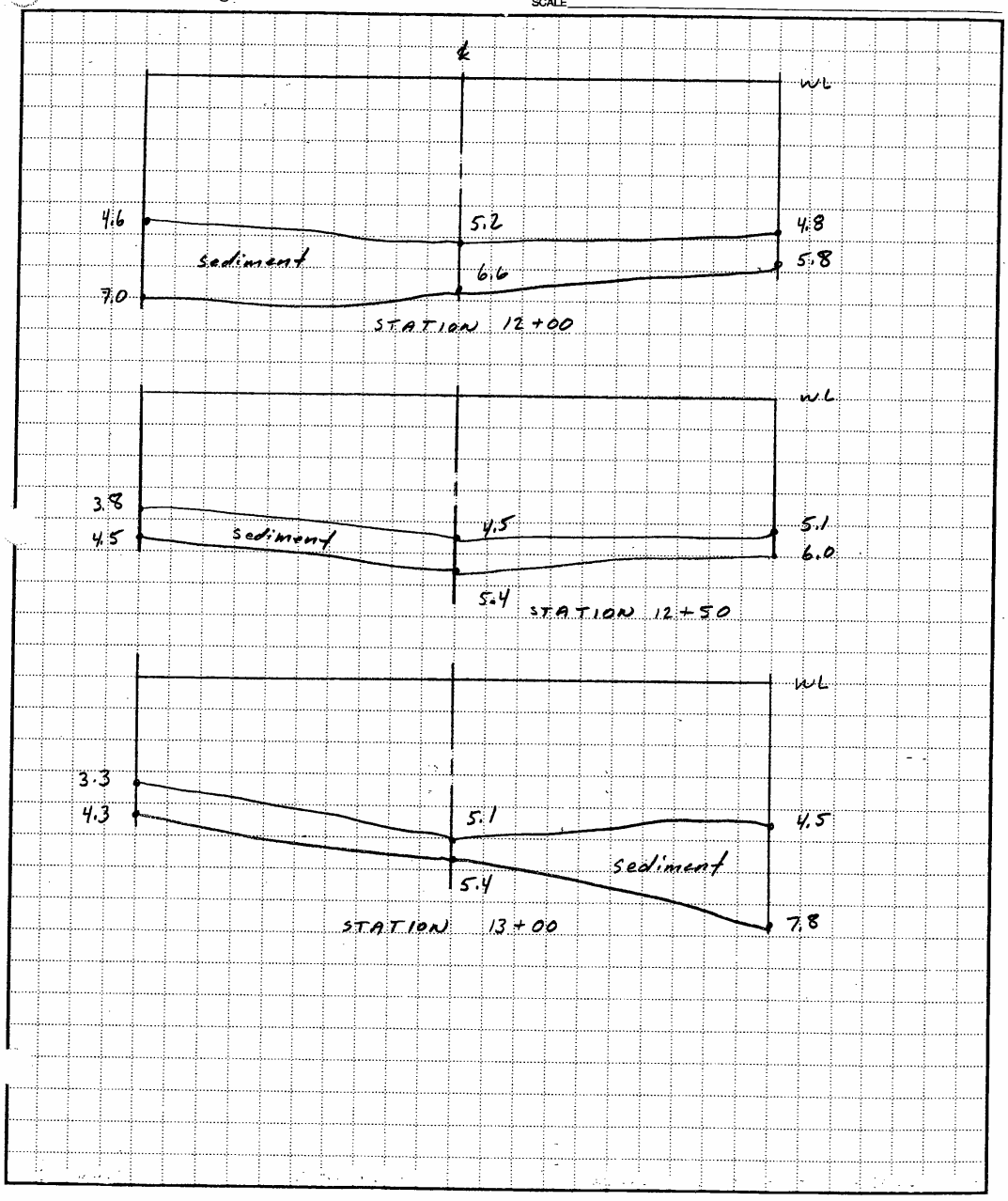
SCALE _____



WEST LAKES
CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by Rick Smigielski 574-250-2538

JOB Jones Channel
SHEET NO. 9 of OF 25
CALCULATED BY DATE 8-8-2005
CHECKED BY DATE
SCALE



WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by Rick Smigielski 574-250-2538

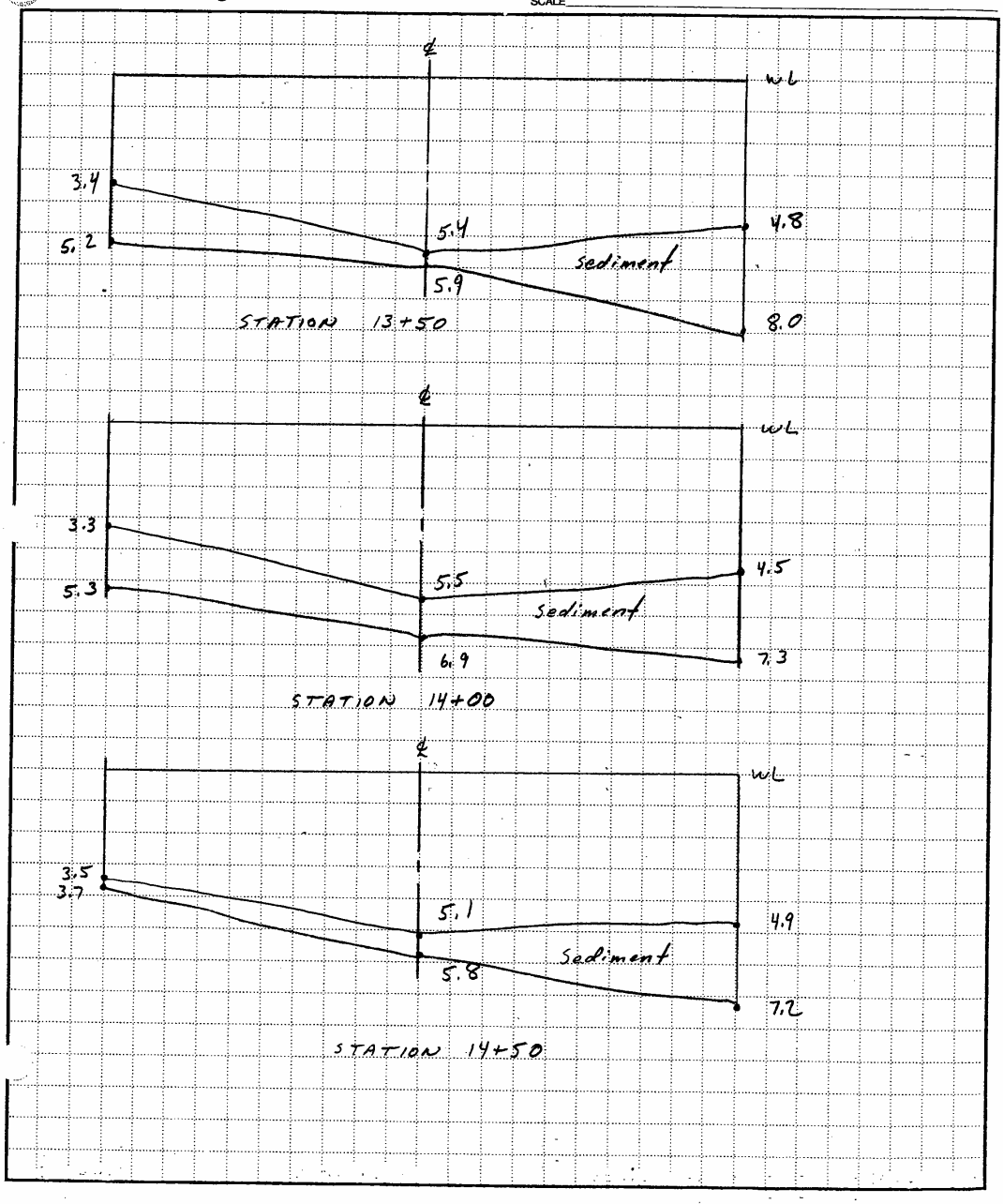
JOB Jones Channel

SHEET NO. 10 N OF 25

CALCULATED BY _____ DATE 8-8-2005

CHECKED BY _____ DATE _____

SCALE _____



WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by Rick Smigielski 574-250-2538

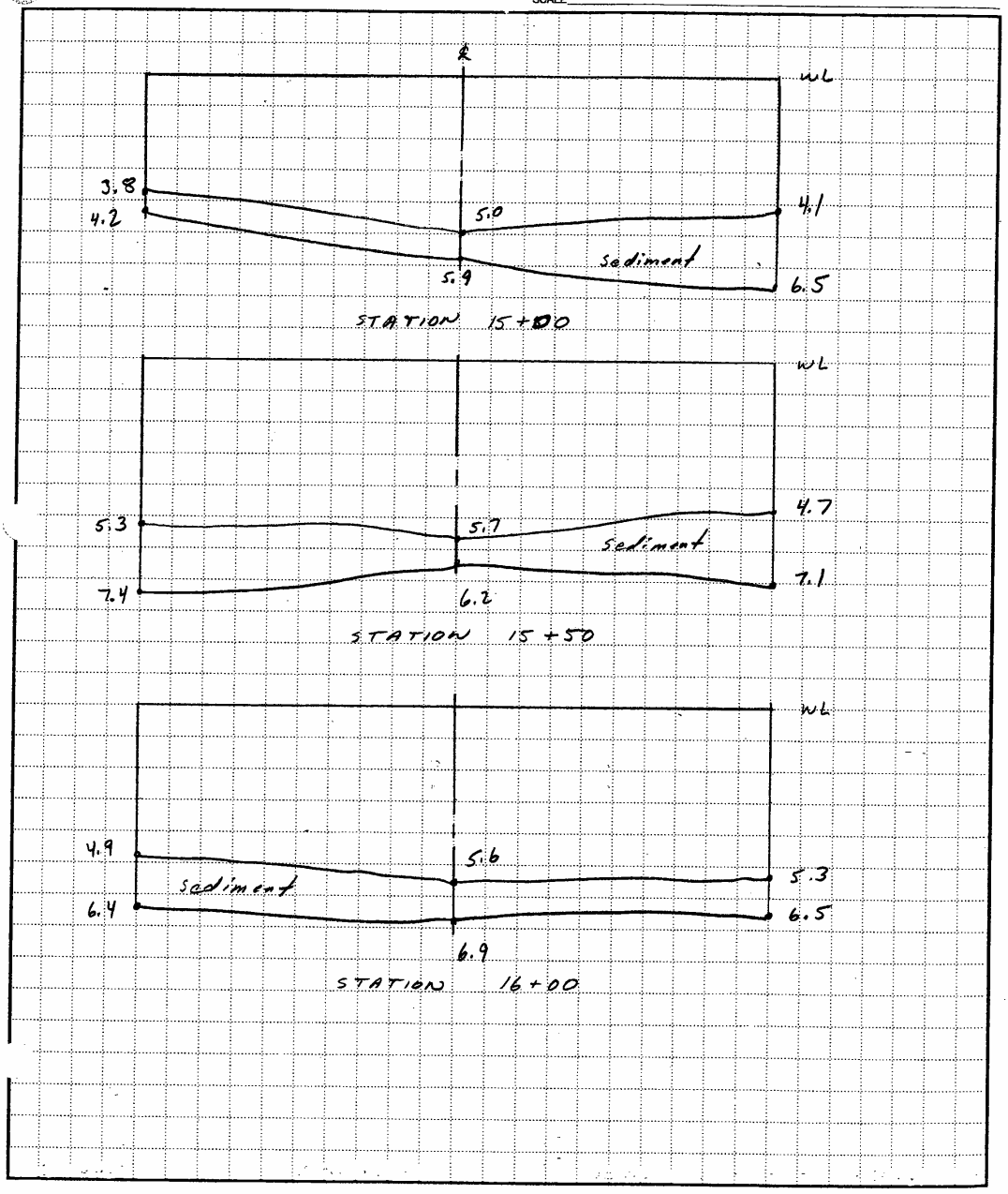
JOB Jones Channel

SHEET NO. 11 J OF 25

CALCULATED BY _____ DATE 8-8-05

CHECKED BY _____ DATE _____

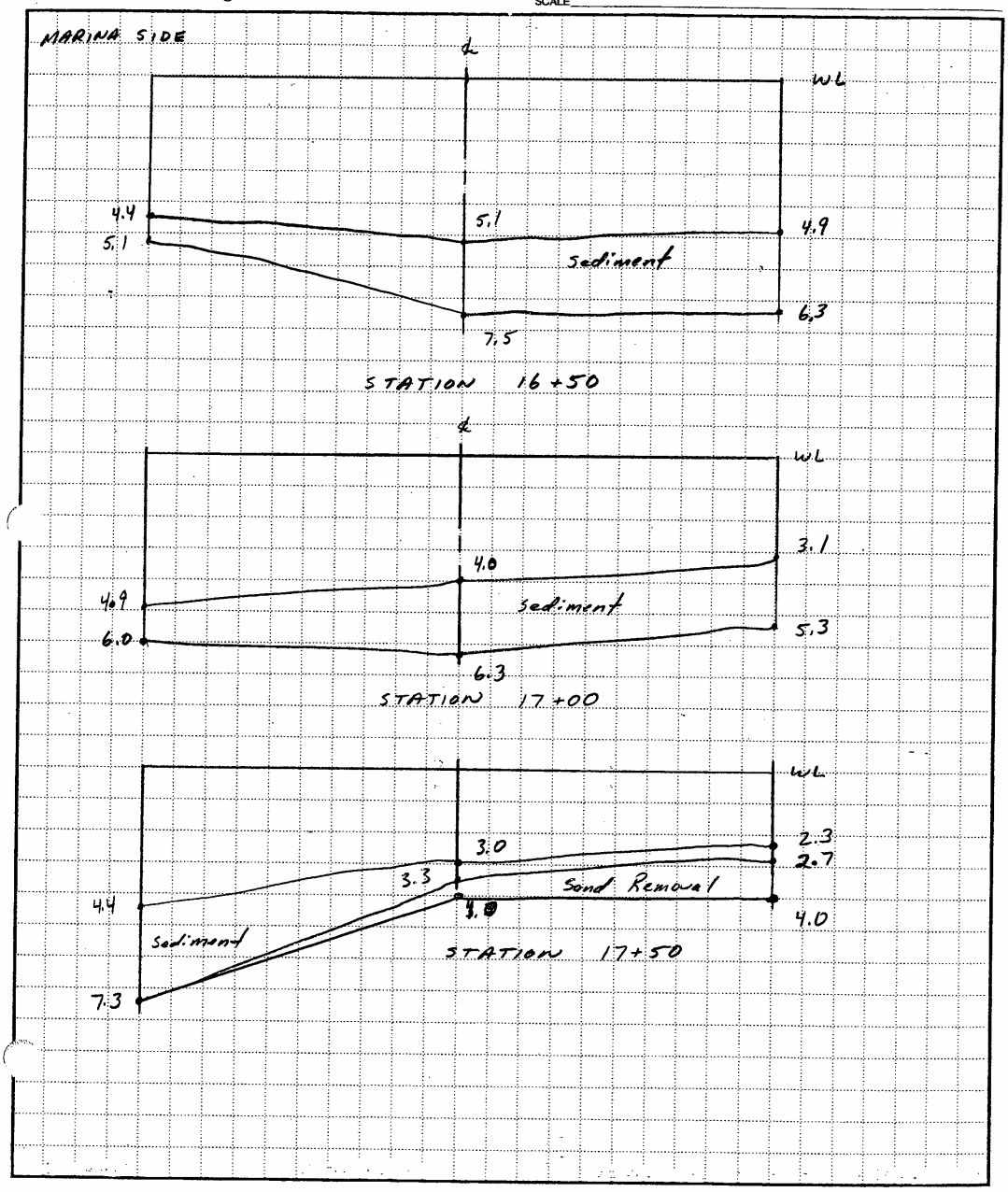
SCALE _____



WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by
Rick Smigielski 574-250-2538

JOB Jones Channel
SHEET NO. 12 of OF 25
CALCULATED BY DATE 8-8-2005
CHECKED BY DATE
SCALE



WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by Rick Smigielski 574-250-2538

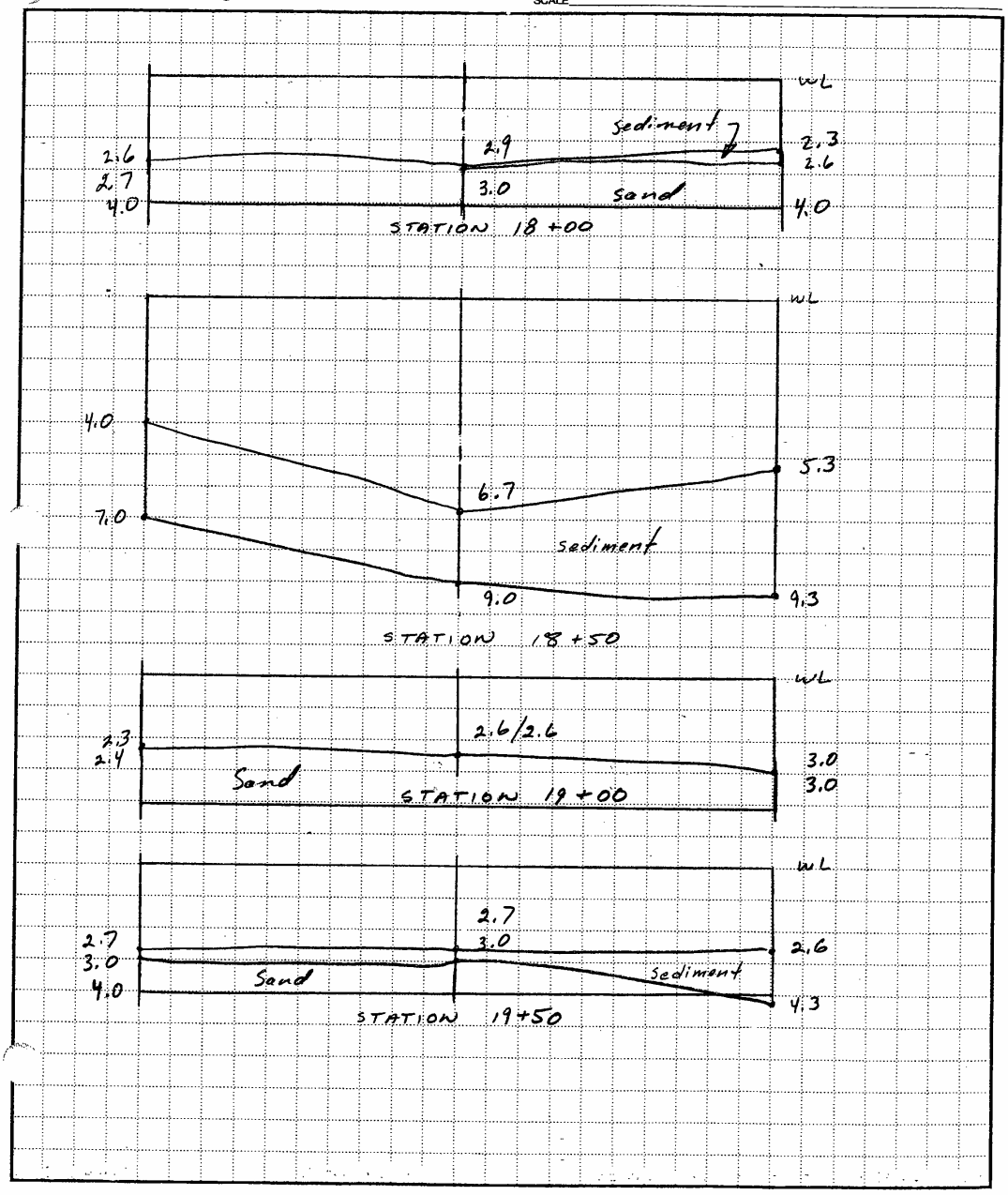
JOB Jones Channel

SHEET NO. 13 of 25 OF 25

CALCULATED BY _____ DATE 8-8-2005

CHECKED BY _____ DATE _____

SCALE _____



WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by Rick Smigielski 574-250-2538

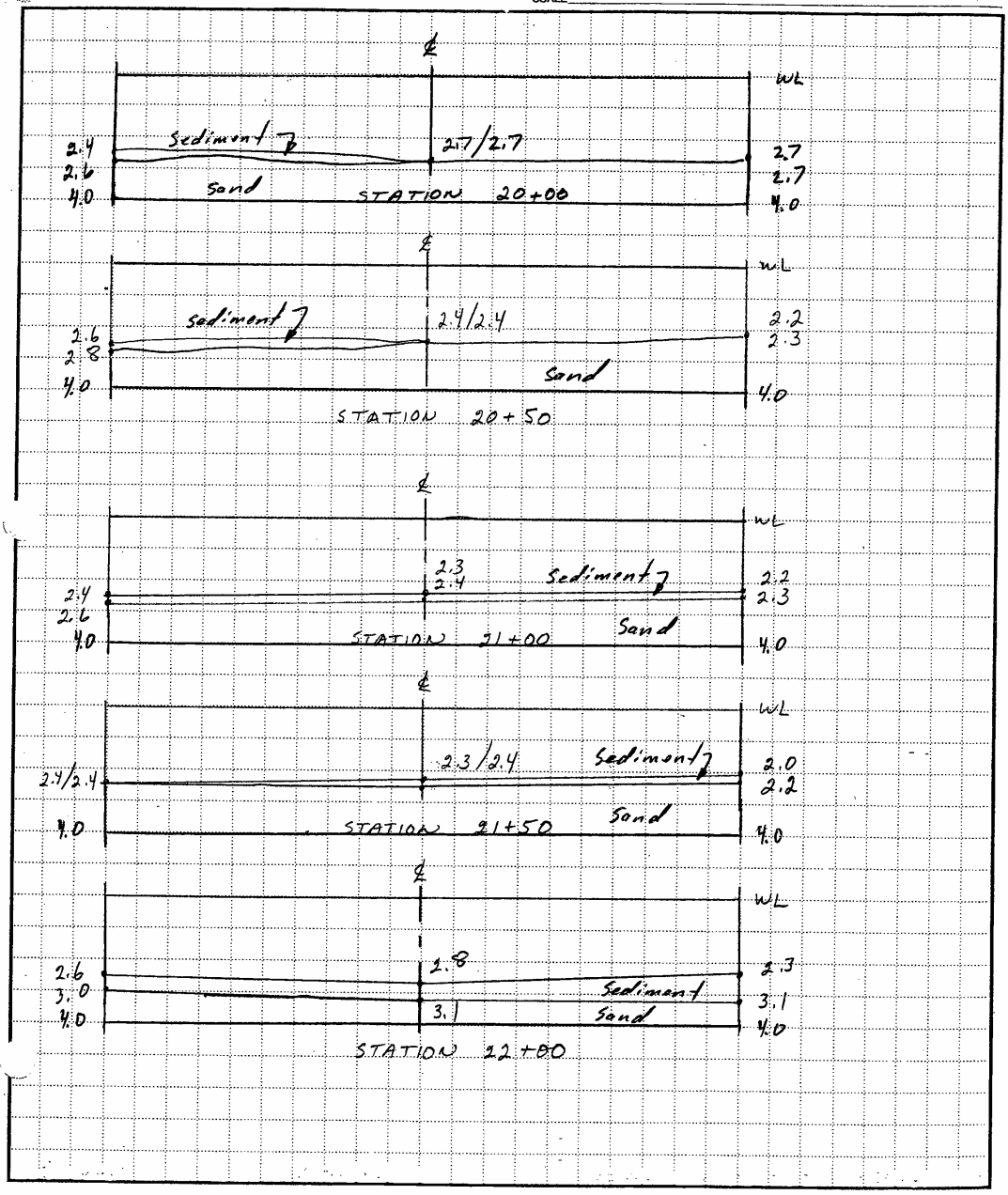
JOB Jones Channel

SHEET NO. 14 d OF 25

CALCULATED BY _____ DATE 8-8-2005

CHECKED BY _____ DATE _____

SCALE _____



WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by Rick Smigielski 574-250-2538

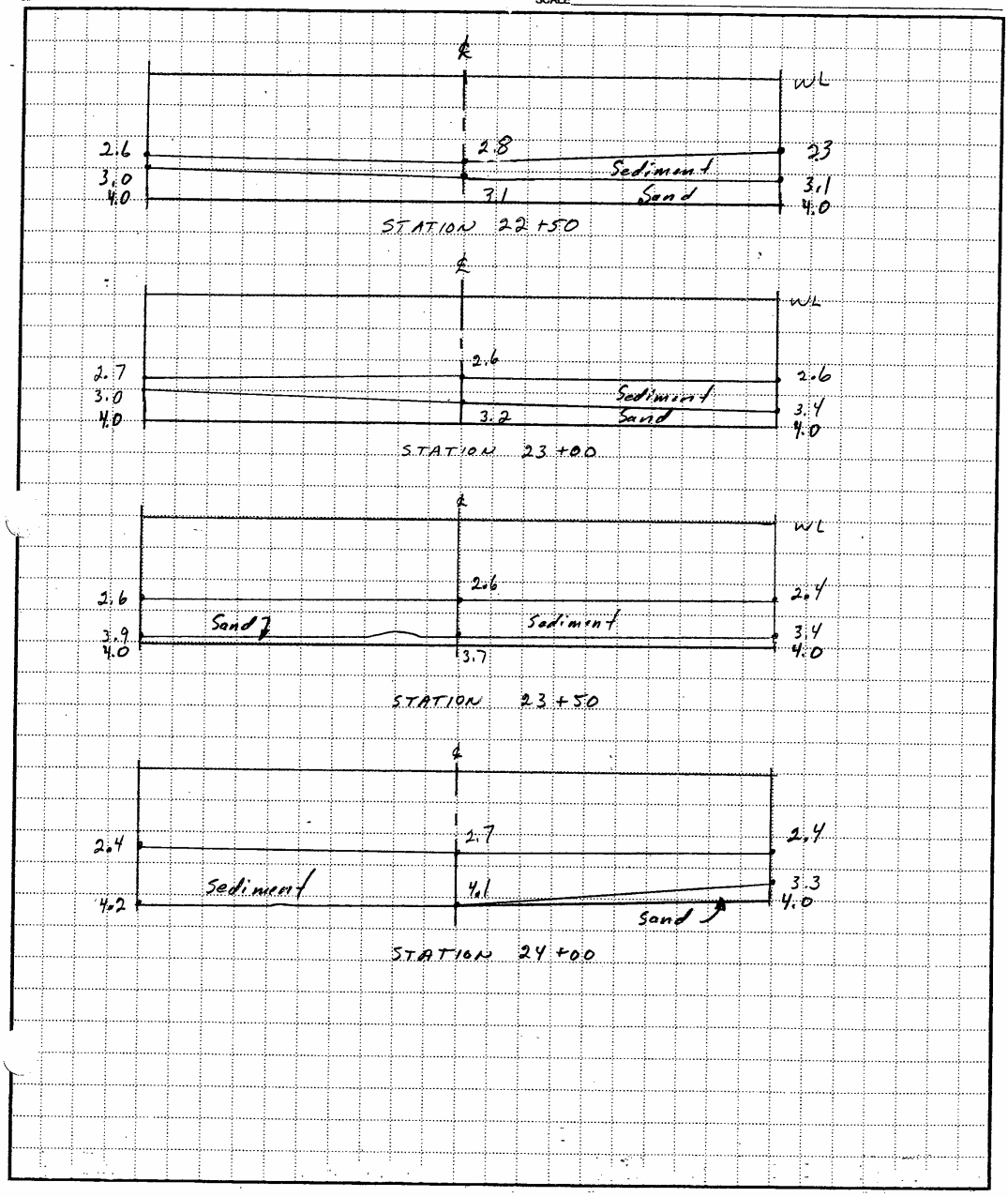
JOB Jones Channel

SHEET NO. 15d OF 25

CALCULATED BY _____ DATE 8-10-2005

CHECKED BY _____ DATE _____

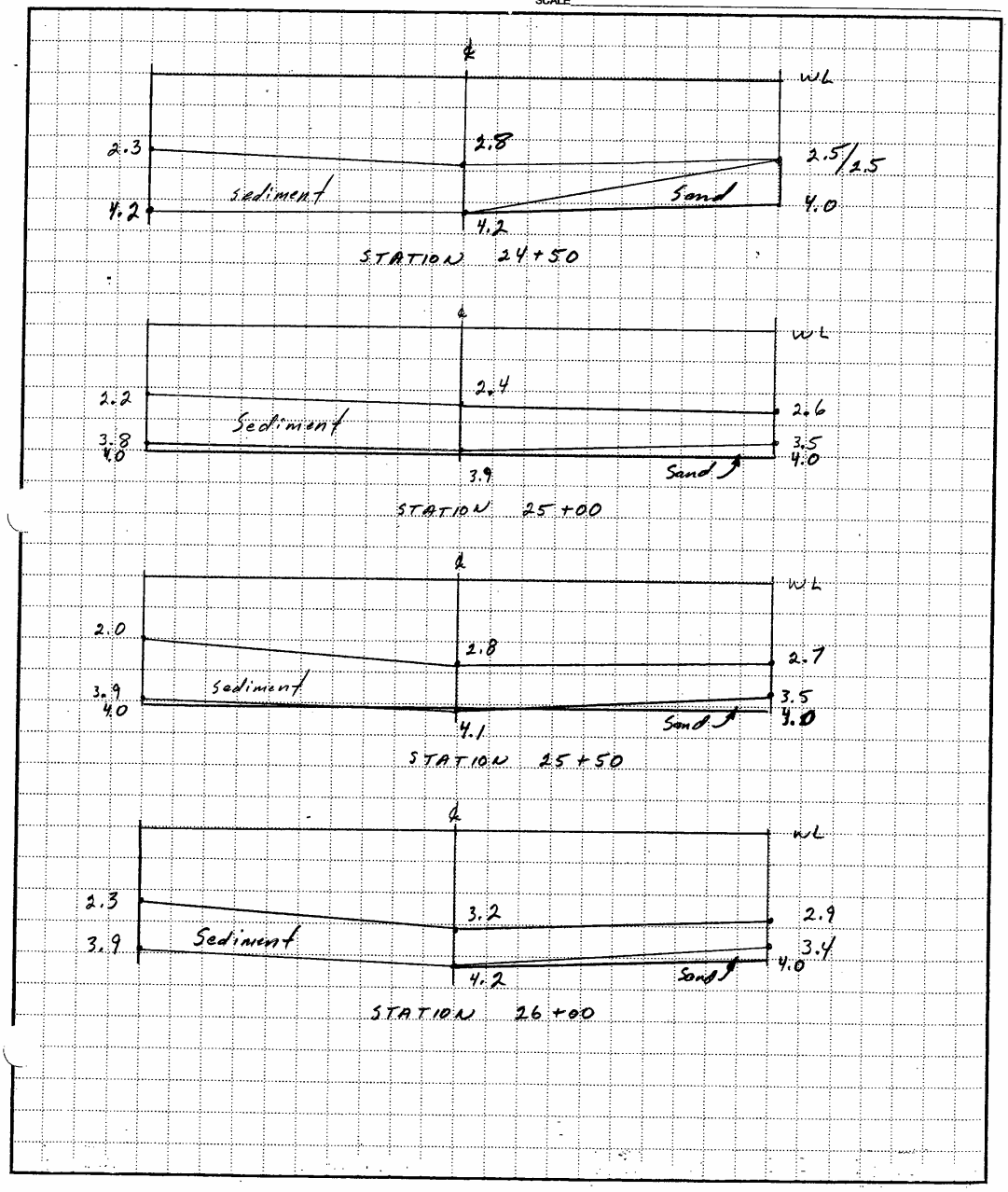
SCALE _____



WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by
Rick Smigielski 574-250-2538

JOB Danes Channel
SHEET NO. 16 of OF 25
CALCULATED BY _____ DATE 8-10-2005
CHECKED BY _____ DATE _____
SCALE _____



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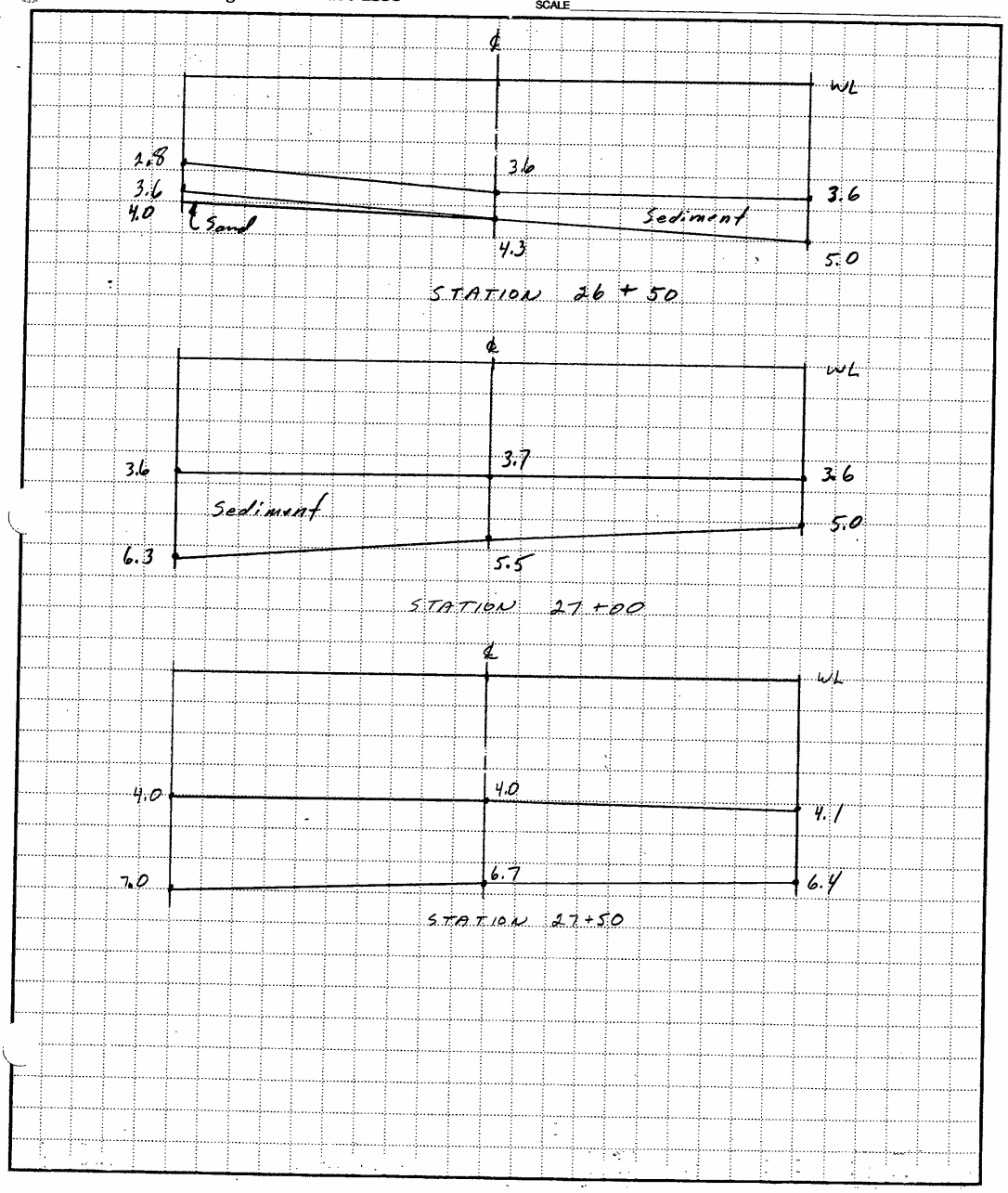
Engineering field survey, cross sectioning and data analysis by
Rick Smigielski 574-250-2538

JOB Jones Channel
SHEET NO. 17 of OF 25
CALCULATED BY DATE 8-10-2005
CHECKED BY DATE
SCALE



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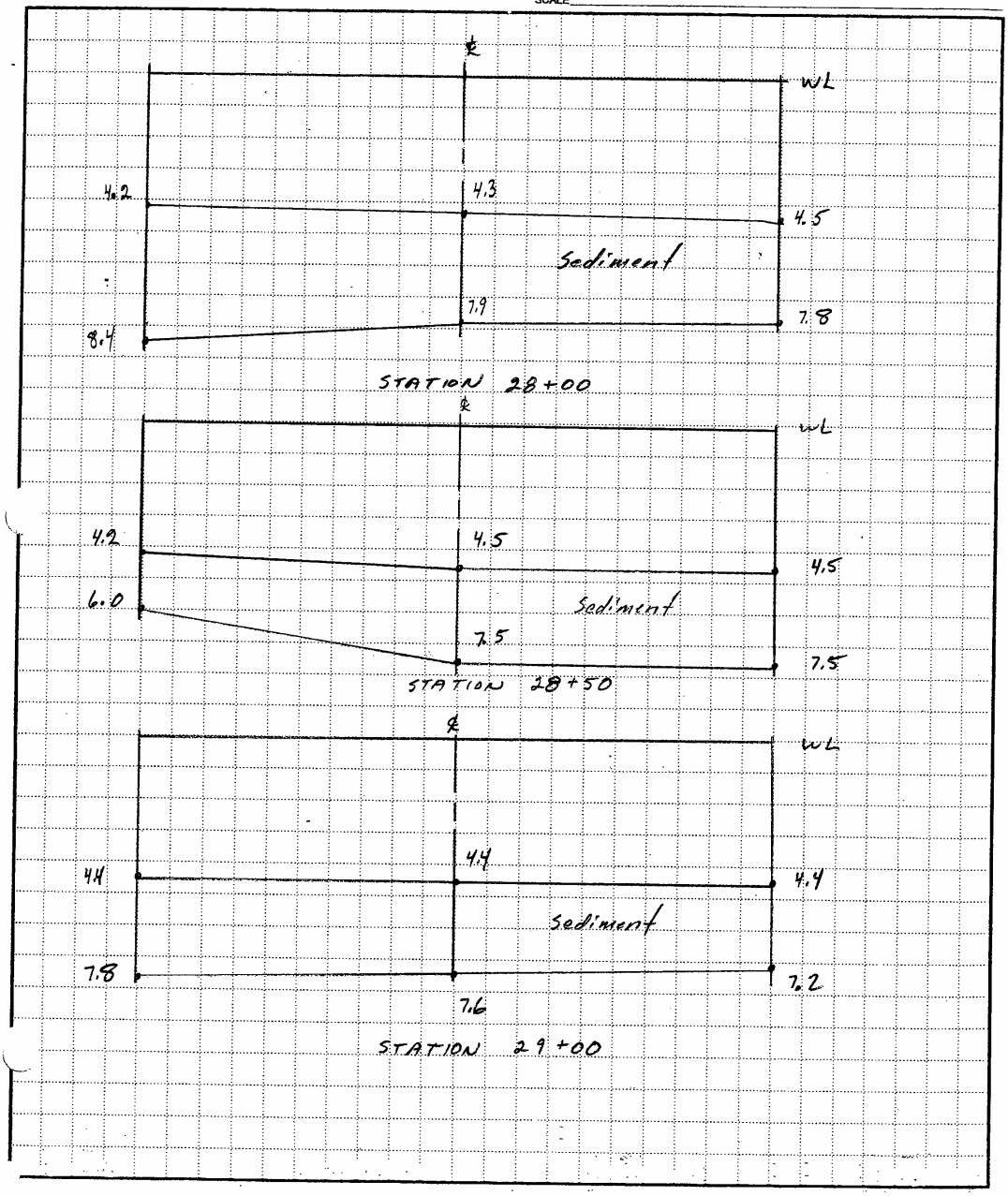
JOB Jones Channel

SHEET NO. 18d OF 25

CALCULATED BY _____ DATE 8-10-2005

CHECKED BY _____ DATE _____

SCALE _____



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Engineering field survey, cross sectioning and data analysis by Rick Smigielski 574-250-2538

JOB Jones Channel

SHEET NO. 19 of OF 25

CALCULATED BY _____ DATE 8-11-2005

CHECKED BY _____ DATE _____

SCALE _____

Start 0+00 $\left[\frac{(7.1-4.0)+(7.0-4.0)}{2}\times 15\right]+\left[\frac{(7.0-4.0)+(7.2-4.0)}{2}\times 15\right]$ = 93 SF

0+50 $\left[\frac{(7.0-3.7)+(7.0-3.6)}{2}\times 15\right]+\left[\frac{(7.0-3.6)+(7.0-3.5)}{2}\times 15\right]$ = 103

1+00 $\left[\frac{(7.0-3.6)+(7.0-3.6)}{2}\times 15\right]+\left[\frac{(7.0-3.5)+(7.0-3.6)}{2}\times 15\right]$ = 103

1+50 $\left[\frac{(7.1-4.1)+(7.0-3.9)}{2}\times 15\right]+\left[\frac{(7.0-3.9)+(7.3-3.8)}{2}\times 15\right]$ = 96

2+00 $\left[\frac{(7.2-3.8)+(7.3-4.2)}{2}\times 15\right]+\left[\frac{(7.3-4.2)+(7.3-4.0)}{2}\times 15\right]$ = 97

2+50 $\left[\frac{(7.6-4.6)+(7.6-4.6)}{2}\times 15\right]+\left[\frac{(7.6-4.6)+(7.6-4.6)}{2}\times 15\right]$ = 90

3+00 $\left[\frac{(8.1-4.5)+(8.1-4.5)}{2}\times 15\right]+\left[\frac{(8.1-4.5)+(8.1-4.5)}{2}\times 15\right]$ = 108

3+50 $\left[\frac{(7.5-5.5)+(7.5-4.8)}{2}\times 15\right]+\left[\frac{(7.5-4.8)+(7.5-4.8)}{2}\times 15\right]$ = 77

4+00 $\left[\frac{(6.2-3.9)+(8.2-5.1)}{2}\times 15\right]+\left[\frac{(8.2-5.1)+(8.4-4.8)}{2}\times 15\right]$ = 92

4+50 $\left[\frac{(6.2-3.9)+(8.9-5.0)}{2}\times 15\right]+\left[\frac{(8.9-5.0)+(8.6-4.7)}{2}\times 15\right]$ = 106

5+00 $\left[\frac{(6.5-4.6)+(9.0-5.0)}{2}\times 15\right]+\left[\frac{(9.0-5.0)+(9.0-4.9)}{2}\times 15\right]$ = 106

WEST LAKES CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by Rick Smigielski 574-250-2538

JOB Jones Channel

SHEET NO. 20 of OF 25

CALCULATED BY _____ DATE 8-11-2005

CHECKED BY _____ DATE _____

SCALE _____

5+50	$\left[\frac{(9.0-4.9)+(9.0-5.2)}{2}\times 15\right]+\left[\frac{(9.0-5.2)+(9.0-4.8)}{2}\times 15\right]$	120
6+00	$\left[\frac{(9.0-5.5)+(9.0-5.2)}{2}\times 15\right]+\left[\frac{(9.0-5.2)+(9.0-4.6)}{2}\times 15\right]$	117
6+50	$\left[\frac{(6.6-3.8)+(9.0-4.8)}{2}\times 15\right]+\left[\frac{(9.0-4.8)+(8.4-4.3)}{2}\times 15\right]$	116
7+00	$\left[\frac{(7.7-4.7)+(9.0-5.0)}{2}\times 15\right]+\left[\frac{(9.0-5.0)+(8.0-4.3)}{2}\times 15\right]$	111
7+50	$\left[\frac{(7.0-5.6)+(7.2-5.0)}{2}\times 15\right]+\left[\frac{(7.2-5.0)+(6.8-4.4)}{2}\times 15\right]$	62
8+00	$\left[\frac{(7.3-5.6)+(8.4-4.3)}{2}\times 15\right]+\left[\frac{(8.4-4.3)+(7.6-3.8)}{2}\times 15\right]$	104
8+50	$\left[\frac{(9.0-6.1)+(8.0-4.2)}{2}\times 15\right]+\left[\frac{(8.0-4.2)+(8.0-4.2)}{2}\times 15\right]$	108
9+00	$\left[\frac{(8.5-4.3)+(8.0-4.5)}{2}\times 15\right]+\left[\frac{(8.0-4.5)+(7.3-4.3)}{2}\times 15\right]$	107
9+50	$\left[\frac{(8.5-5.4)+(7.8-4.6)}{2}\times 15\right]+\left[\frac{(7.8-4.6)+(7.0-3.8)}{2}\times 15\right]$	96
10+00	$\left[\frac{(8.3-5.4)+(8.4-4.6)}{2}\times 15\right]+\left[\frac{(8.4-4.6)+(7.9-4.1)}{2}\times 15\right]$	108
10+50	$\left[\frac{(7.5-4.7)+(8.2-4.6)}{2}\times 15\right]+\left[\frac{(8.2-4.6)+(7.9-4.3)}{2}\times 15\right]$	102
11+00	$\left[\frac{(6.1-4.0)+(8.1-5.1)}{2}\times 15\right]+\left[\frac{(8.1-5.1)+(5.6-4.8)}{2}\times 15\right]$	68

WEST LAKES CONSERVATION, INC

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11+50	$\left[\frac{(5.8-4.0)+(6.4-5.0)}{2} \times 15\right] + \left[\frac{(6.4-5.0)+(5.3-4.8)}{2} \times 15\right]$	46
12+00	$\left[\frac{(7.0-4.6)+(6.6-5.2)}{2} \times 15\right] + \left[\frac{(6.6-5.2)+(5.8-4.8)}{2} \times 15\right]$	47
12+50	$\left[\frac{(4.5-3.8)+(5.4-4.5)}{2} \times 15\right] + \left[\frac{(5.4-4.5)+(6.0-5.1)}{2} \times 15\right]$	26
13+00	$\left[\frac{(4.3-3.3)+(5.4-5.1)}{2} \times 15\right] + \left[\frac{(5.4-5.1)+(7.8-4.5)}{2} \times 15\right]$	38
13+50	$\left[\frac{(5.2-3.4)+(5.9-5.4)}{2} \times 15\right] + \left[\frac{(5.9-5.4)+(8.0-4.8)}{2} \times 15\right]$	46
14+00	$\left[\frac{(5.3-3.3)+(6.9-5.5)}{2} \times 15\right] + \left[\frac{(6.9-5.5)+(7.3-4.5)}{2} \times 15\right]$	58
14+50	$\left[\frac{(3.7-3.5)+(5.8-5.1)}{2} \times 15\right] + \left[\frac{(5.8-5.1)+(7.2-4.9)}{2} \times 15\right]$	30
15+00	$\left[\frac{(4.2-3.8)+(5.9-5.0)}{2} \times 15\right] + \left[\frac{(5.9-5.0)+(6.5-5.3)}{2} \times 15\right]$	26
15+50	$\left[\frac{(7.4-5.3)+(6.2-5.7)}{2} \times 15\right] + \left[\frac{(6.2-5.7)+(7.1-4.7)}{2} \times 15\right]$	42
16+00	$\left[\frac{(6.4-4.9)+(6.9-5.6)}{2} \times 15\right] + \left[\frac{(6.9-5.6)+(6.5-5.3)}{2} \times 15\right]$	40
16+50	$\left[\frac{(5.1-4.4)+(7.5-5.1)}{2} \times 15\right] + \left[\frac{(7.5-5.1)+(6.3-4.9)}{2} \times 15\right]$	53
17+00	$\left[\frac{(6.0-4.9)+(6.3-4.0)}{2} \times 15\right] + \left[\frac{(6.3-4.0)+(5.3-3.1)}{2} \times 15\right]$	60

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17+50	$\left[\frac{(7.3-4.4)+(3.3-3.0)}{2}\times 15\right]+\left[\frac{(3.3-3.0)+(2.7-2.3)}{2}\times 15\right]$	30
18+00	$\left[\frac{(2.7-2.6)+(3.0-2.9)}{2}\times 15\right]+\left[\frac{(3.0-2.9)+(2.6-2.3)}{2}\times 15\right]$	5
18+50	$\left[\frac{(7.0-4.0)+(9.0-6.7)}{2}\times 15\right]+\left[\frac{(9.0-6.7)+(9.3-5.3)}{2}\times 15\right]$	87
19+00	$\left[\frac{(2.4-2.3)+(2.6-2.6)}{2}\times 15\right]+\left[\frac{(2.6-2.6)+(3.0-3.0)}{2}\times 15\right]$	2
19+50	$\left[\frac{(3.0-2.7)+(3.0-2.7)}{2}\times 15\right]+\left[\frac{(3.0-2.7)+(4.3-2.6)}{2}\times 15\right]$	20
20+00	$\left[\frac{(2.6-2.4)+(2.7-2.7)}{2}\times 15\right]+\left[\frac{(2.7-2.7)+(2.7-2.7)}{2}\times 15\right]$	2
20+50	$\left[\frac{(2.8-2.6)+(2.4-2.4)}{2}\times 15\right]+\left[\frac{(2.4-2.4)+(2.3-2.2)}{2}\times 15\right]$	3
21+00	$\left[\frac{(2.6-2.4)+(2.4-2.3)}{2}\times 15\right]+\left[\frac{(2.4-2.3)+(2.3-2.2)}{2}\times 15\right]$	4
21+50	$\left[\frac{(2.4-2.4)+(2.4-2.3)}{2}\times 15\right]+\left[\frac{(2.4-2.3)+(2.2-2.0)}{2}\times 15\right]$	3
22+00	$\left[\frac{(3.0-2.6)+(3.1-2.8)}{2}\times 15\right]+\left[\frac{(3.1-2.8)+(3.1-2.3)}{2}\times 15\right]$	14
22+50	$\left[\frac{(3.0-2.6)+(3.1-2.8)}{2}\times 15\right]+\left[\frac{(3.1-2.8)+(3.1-2.3)}{2}\times 15\right]$	14
23+00	$\left[\frac{(3.0-2.7)+(3.2-2.6)}{2}\times 15\right]+\left[\frac{(3.2-2.6)+(3.4-2.6)}{2}\times 15\right]$	18

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23+50	$\left[\frac{(3.9-2.6)+(3.7-2.6)}{2}\times 15\right]$	$+\left[\frac{(3.7-2.6)+(3.4-2.4)}{2}\times 15\right]$	34
24+00	$\left[\frac{(4.2-2.4)+(4.1-2.7)}{2}\times 15\right]$	$+\left[\frac{(4.1-2.7)+(3.3-2.4)}{2}\times 15\right]$	41
24+50	$\left[\frac{(4.2-2.3)+(4.2-2.8)}{2}\times 15\right]$	$+\left[\frac{(4.2-2.8)+(2.5-2.5)}{2}\times 15\right]$	36
25+00	$\left[\frac{(3.8-2.2)+(3.9-2.4)}{2}\times 15\right]$	$+\left[\frac{(3.9-2.4)+(3.5-2.6)}{2}\times 15\right]$	42
25+50	$\left[\frac{(3.9-2.0)+(4.1-2.8)}{2}\times 15\right]$	$+\left[\frac{(4.1-2.8)+(3.5-2.7)}{2}\times 15\right]$	40
26+00	$\left[\frac{(3.9-2.3)+(4.2-3.2)}{2}\times 15\right]$	$+\left[\frac{(4.2-3.2)+(3.4-2.9)}{2}\times 15\right]$	32
26+50	$\left[\frac{(3.6-2.8)+(4.3-3.6)}{2}\times 15\right]$	$+\left[\frac{(4.3-3.6)+(5.0-3.6)}{2}\times 15\right]$	27
27+00	$\left[\frac{(6.3-3.6)+(5.5-3.7)}{2}\times 15\right]$	$+\left[\frac{(5.5-3.7)+(5.0-3.6)}{2}\times 15\right]$	58
27+50	$\left[\frac{(7.0-4.0)+(6.7-4.0)}{2}\times 15\right]$	$+\left[\frac{(6.7-4.0)+(6.4-4.1)}{2}\times 15\right]$	81
28+00	$\left[\frac{(8.4-4.2)+(7.9-4.3)}{2}\times 15\right]$	$+\left[\frac{(7.9-4.3)+(7.8-4.5)}{2}\times 15\right]$	111
28+50	$\left[\frac{(6.0-4.2)+(7.5-4.5)}{2}\times 15\right]$	$+\left[\frac{(7.5-4.5)+(7.5-4.5)}{2}\times 15\right]$	81
29+00	$\left[\frac{(7.8-4.4)+(7.6-4.4)}{2}\times 15\right]$	$+\left[\frac{(7.6-4.4)+(7.2-4.4)}{2}\times 15\right]$	95

WEST LAKES CONSERVATION, INC

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0+00	to	0+50	-	(93	+	103)	/2	x	50	=	4900
0+50	to	1+00	-	(103	+	103)	/2	x	50	=	5150
1+00	to	1+50	-	(103	+	96)	/2	x	50	=	4975
1+50	to	2+00	-	(96	+	97)	/2	x	50	=	4825
2+00	to	2+50	-	(97	+	90)	/2	x	50	=	4675
2+50	to	3+00	-	(90	+	108)	/2	x	50	=	4950
3+00	to	3+50	-	(108	+	77)	/2	x	50	=	4625
3+50	to	4+00	-	(77	+	92)	/2	x	50	=	4225
4+00	to	4+50	-	(92	+	106)	/2	x	50	=	4950
4+50	to	5+00	-	(106	+	106)	/2	x	50	=	5300
5+00	to	5+50	-	(106	+	120)	/2	x	50	=	5650
5+50	to	6+00	-	(120	+	117)	/2	x	50	=	5925
6+00	to	6+50	-	(117	+	116)	/2	x	50	=	5825
6+50	to	7+00	-	(116	+	111)	/2	x	50	=	5675
7+00	to	7+50	-	(111	+	62)	/2	x	50	=	4325
7+50	to	8+00	-	(62	+	104)	/2	x	50	=	4150
8+00	to	8+50	-	(104	+	108)	/2	x	50	=	5300
8+50	to	9+00	-	(108	+	107)	/2	x	50	=	5375
9+00	to	9+50	-	(107	+	96)	/2	x	50	=	5075
9+50	to	10+00	-	(96	+	108)	/2	x	50	=	5100
10+00	to	10+50	-	(108	+	102)	/2	x	50	=	5250
10+50	to	11+00	-	(102	+	68)	/2	x	50	=	4250
11+00	to	11+50	-	(68	+	46)	/2	x	50	=	2850
11+50	to	12+00	-	(46	+	47)	/2	x	50	=	2325
12+00	to	12+50	-	(47	+	26)	/2	x	50	=	1825
12+50	to	13+00	-	(26	+	38)	/2	x	50	=	1600
13+00	to	13+50	-	(38	+	46)	/2	x	50	=	2100
13+50	to	14+00	-	(46	+	58)	/2	x	50	=	2600
14+00	to	14+50	-	(58	+	30)	/2	x	50	=	2200
14+50	to	15+00	-	(30	+	26)	/2	x	50	=	1400
15+00	to	15+50	-	(26	+	42)	/2	x	50	=	1700

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15+50	to	16+00	- (	42	+ 40	) / 2	x	50	=	2050
16+00	to	16+50	- (	40	+ 53	) / 2	x	50	=	2325
16+50	to	17+00	- (	53	+ 60	) / 2	x	50	=	2825
17+00	to	17+50	- (	60	+ 30	) / 2	x	50	=	2250
17+50	to	18+00	- (	30	+ 5	) / 2	x	50	=	875
18+00	to	18+50	- (	5	+ 87	) / 2	x	50	=	2300
18+50	to	19+00	- (	87	+ 2	) / 2	x	50	=	2225
19+00	to	19+50	- (	2	+ 20	) / 2	x	50	=	550
19+50	to	20+00	- (	20	+ 2	) / 2	x	50	=	550
20+00	to	20+50	- (	2	+ 3	) / 2	x	50	=	125
20+50	to	21+00	- (	3	+ 4	) / 2	x	50	=	175
21+00	to	21+50	- (	4	+ 3	) / 2	x	50	=	175
21+50	to	22+00	- (	3	+ 14	) / 2	x	50	=	425
22+00	to	22+50	- (	14	+ 14	) / 2	x	50	=	700
22+50	to	23+00	- (	14	+ 18	) / 2	x	50	=	800
23+00	to	23+50	- (	18	+ 31	) / 2	x	50	=	1300
23+50	to	24+00	- (	34	+ 41	) / 2	x	50	=	1875
24+00	to	24+50	- (	41	+ 36	) / 2	x	50	=	1925
24+50	to	25+00	- (	36	+ 42	) / 2	x	50	=	1950
25+00	to	25+50	- (	42	+ 40	) / 2	x	50	=	2050
25+50	to	26+00	- (	40	+ 32	) / 2	x	50	=	1800
26+00	to	26+50	- (	32	+ 27	) / 2	x	50	=	1475
26+50	to	27+00	- (	27	+ 58	) / 2	x	50	=	2125
27+00	to	27+50	- (	58	+ 81	) / 2	x	50	=	3475
27+50	to	28+00	- (	81	+ 111	) / 2	x	50	=	4800
28+00	to	28+50	- (	111	+ 81	) / 2	x	50	=	4800
28+50	to	29+00	- (	81	+ 95	) / 2	x	50	=	4400

TOTAL CUBIC FEET / CUBIC YARDS 179,400 CF / 6650 CY

6,650 CY x 1.15 expansion factor x 1.05 turns = 8030 CY

WEST LAKES
CONSERVATION, INC

Engineering field survey, cross sectioning and data analysis by
Rick Smigielski 574-250-2538

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17+00 $\left[\frac{(6.0-4.9)+(6.3-4.0)\times 15}{2}\right] + \left[\frac{(6.3-4.0)+(5.3-4.0)\times 15}{2}\right] = 53$

17+50 $\left[\frac{(7.3-4.4)+(4.0-2.3)\times 15}{2}\right] + \left[\frac{(4.0-3.0)+(4.0-2.3)\times 15}{2}\right] = 55$

18+00 $\left[\frac{(4.0-2.6)+(4.0-2.9)\times 15}{2}\right] + \left[\frac{(4.0-2.9)+(4.0-2.3)\times 15}{2}\right] = 40$

18+50 $\left[\frac{(7.0-4.0)+(9.0-6.7)\times 15}{2}\right] + \left[\frac{(9.0-6.7)+(9.3-5.3)\times 15}{2}\right] = 88$

19+00 $\left[\frac{(4.0-2.3)+(4.0-2.6)\times 15}{2}\right] + \left[\frac{(4.0-2.6)+(4.0-3.0)\times 15}{2}\right] = 41$

19+50 $\left[\frac{(4.0-2.7)+(4.0-2.7)\times 15}{2}\right] + \left[\frac{(4.0-2.7)+(4.3-2.6)\times 15}{2}\right] = 43$

20+00 $\left[\frac{(4.0-2.4)+(4.0-2.7)\times 15}{2}\right] + \left[\frac{(4.0-2.7)+(4.0-2.7)\times 15}{2}\right] = 42$

20+50 $\left[\frac{(4.0-2.6)+(4.0-2.4)\times 15}{2}\right] + \left[\frac{(4.0-2.4)+(4.0-2.2)\times 15}{2}\right] = 49$

21+00 $\left[\frac{(4.0-2.4)+(4.0-2.3)\times 15}{2}\right] + \left[\frac{(4.0-2.3)+(4.0-2.2)\times 15}{2}\right] = 51$

21+50 $\left[\frac{(4.0-2.4)+(4.0-2.3)\times 15}{2}\right] + \left[\frac{(4.0-2.3)+(4.0-2.0)\times 15}{2}\right] = 53$

22+00 $\left[\frac{(4.0-2.6)+(4.0-2.8)\times 15}{2}\right] + \left[\frac{(4.0-2.8)+(4.0-2.3)\times 15}{2}\right] = 42$

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22+50 $\left[\frac{(4.0-2.6)+(4.0-2.8)}{2}\times 15\right] + \left[\frac{(4.0-2.8)+(4.0-2.3)}{2}\times 15\right] = 42$

23+00 $\left[\frac{(4.0-2.7)+(4.0-2.6)}{2}\times 15\right] + \left[\frac{(4.0-2.6)+(4.0-2.6)}{2}\times 15\right] = 41$

23+50 $\left[\frac{(4.0-2.6)+(4.0-2.6)}{2}\times 15\right] + \left[\frac{(4.0-2.6)+(4.0-2.4)}{2}\times 15\right] = 44$

24+00 $\left[\frac{(4.2-2.4)+(4.1-2.7)}{2}\times 15\right] + \left[\frac{(4.1-2.7)+(4.0-2.4)}{2}\times 15\right] = 47$

24+50 $\left[\frac{(4.2-2.3)+(4.2-2.8)}{2}\times 15\right] + \left[\frac{(4.2-2.8)+(4.0-2.5)}{2}\times 15\right] = 47$

25+00 $\left[\frac{(4.0-2.2)+(4.0-2.4)}{2}\times 15\right] + \left[\frac{(4.0-2.4)+(4.0-2.6)}{2}\times 15\right] = 49$

25+50 $\left[\frac{(4.0-2.0)+(4.1-2.8)}{2}\times 15\right] + \left[\frac{(4.1-2.8)+(4.0-2.7)}{2}\times 15\right] = 45$

26+00 $\left[\frac{(4.0-2.3)+(4.2-3.2)}{2}\times 15\right] + \left[\frac{(4.2-3.2)+(4.0-2.9)}{2}\times 15\right] = 36$

26+50 $\left[\frac{(4.0-2.8)+(4.3-3.6)}{2}\times 15\right] + \left[\frac{(4.3-3.6)+(5.0-3.6)}{2}\times 15\right] = 31$

27+00 $\left[\frac{(6.3-3.6)+(5.5-3.7)}{2}\times 15\right] + \left[\frac{(5.5-3.7)+(5.0-3.6)}{2}\times 15\right] = 58$

27+50 $\left[\frac{(7.0-4.0)+(6.7-4.0)}{2}\times 15\right] \quad \left[\frac{(6.7-4.0)+(6.4-4.1)}{2}\times 15\right] = 81$

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28+00 $\left[\frac{(8.4-4.2)+(7.9-4.3)}{2}\times 15\right]+\left[\frac{(7.9-4.3)+(7.8-4.5)}{2}\times 15\right]=$ 111

28+50 $\left[\frac{(6.0-4.2)+(7.5-4.5)}{2}\times 15\right]+\left[\frac{(7.5-4.5)+(7.5-4.5)}{2}\times 15\right]=$ 81

29+00 $\left[\frac{(7.8-4.4)+(7.6-4.4)}{2}\times 15\right]+\left[\frac{(7.6-4.4)+(7.2-4.4)}{2}\times 15\right]=$ 95

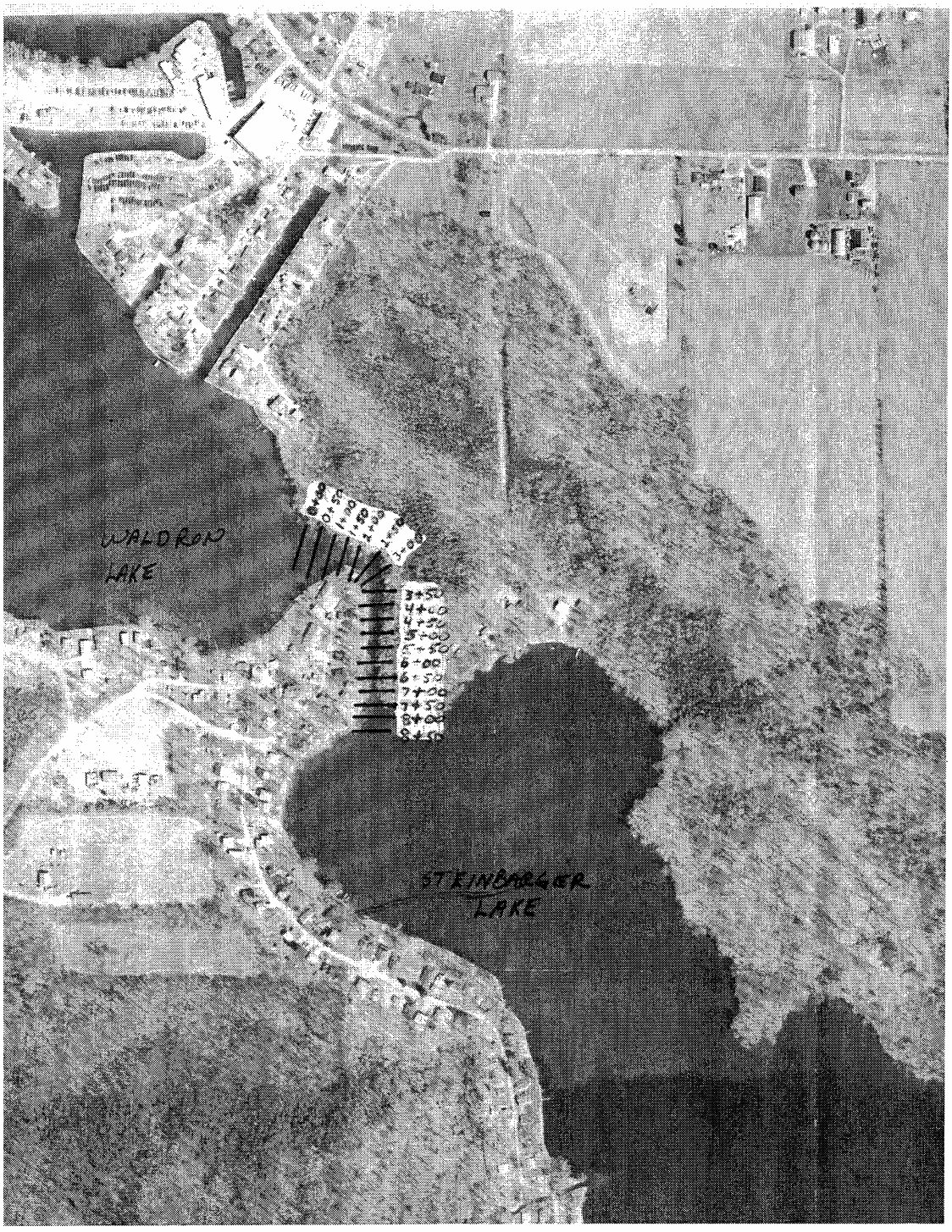
17+00 to 17+50	(53 + 55)	/2	x	50	=	2700
17+50 to 18+00	(55 + 40)	/2	x	50	=	2375
18+00 to 18+50	(40 + 88)	/2	x	50	=	3200
18+50 to 19+00	(88 + 41)	/2	x	50	=	3225
19+00 to 19+50	(41 + 43)	/2	x	50	=	2100
19+50 to 20+00	(43 + 42)	/2	x	50	=	2125
20+00 to 20+50	(42 + 49)	/2	x	50	=	2275
20+50 to 21+00	(49 + 51)	/2	x	50	=	2500
21+00 to 21+50	(51 + 53)	/2	x	50	=	2600
21+50 to 22+00	(53 + 42)	/2	x	50	=	2375
22+00 to 22+50	(42 + 42)	/2	x	50	=	2100
22+50 to 23+00	(42 + 41)	/2	x	50	=	2075
23+00 to 23+50	(41 + 44)	/2	x	50	=	2125
23+50 to 24+00	(44 + 47)	/2	x	50	=	2275
24+00 to 24+50	(47 + 47)	/2	x	50	=	2350
24+50 to 25+00	(47 + 49)	/2	x	50	=	2400
25+00 to 25+50	(49 + 45)	/2	x	50	=	2350
25+50 to 26+00	(45 + 36)	/2	x	50	=	2025
26+00 to 26+50	(36 + 31)	/2	x	50	=	1675
26+50 to 27+00	(31 + 58)	/2	x	50	=	2225
27+00 to 27+50	(58 + 81)	/2	x	50	=	3475
27+50 to 28+00	(81 + 111)	/2	x	50	=	4800
28+00 to 28+50	(111 + 81)	/2	x	50	=	4800
28+50 to 29+00	(81 + 95)	/2	x	50	=	4400

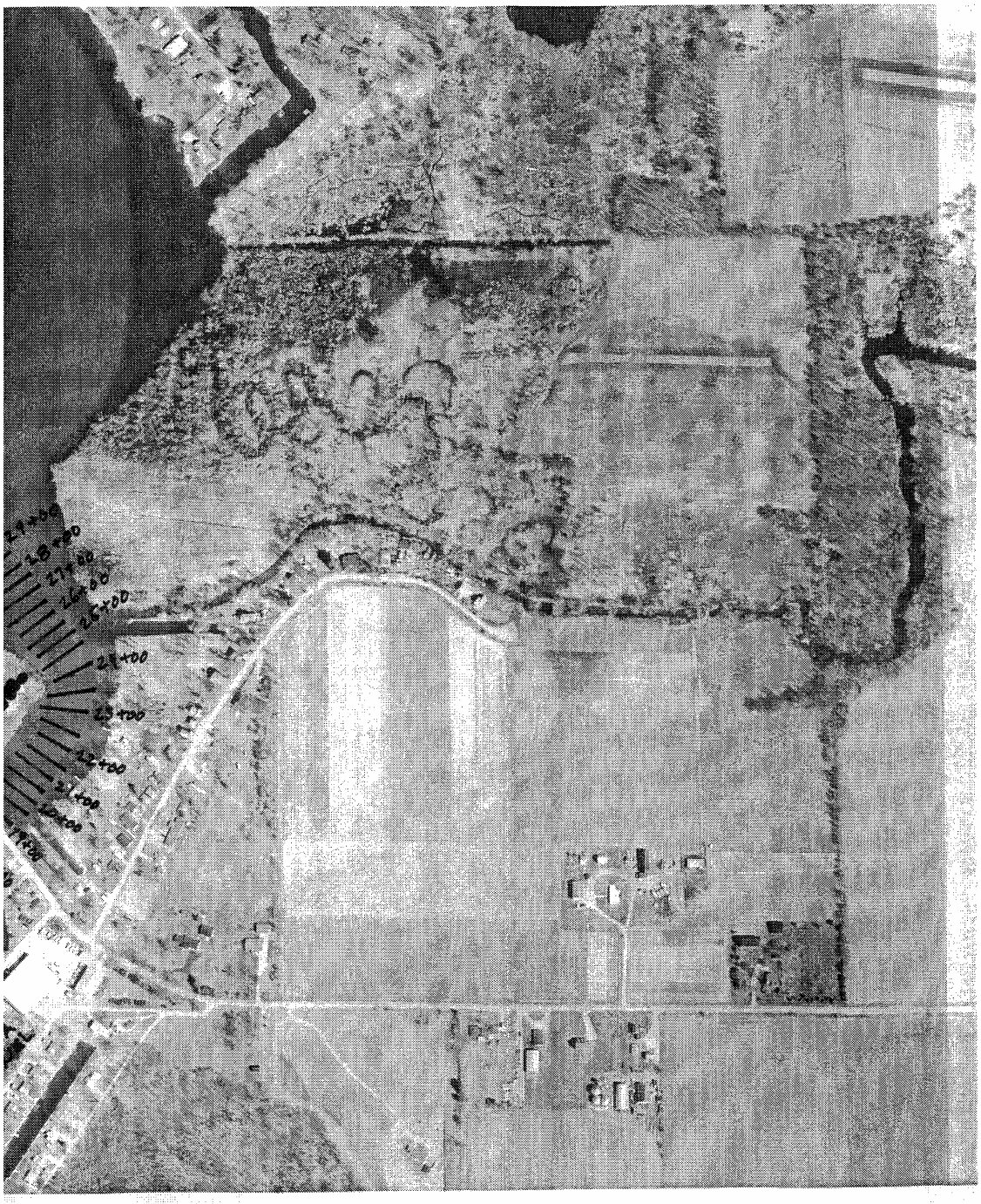
64,550 CF / 2400 CY

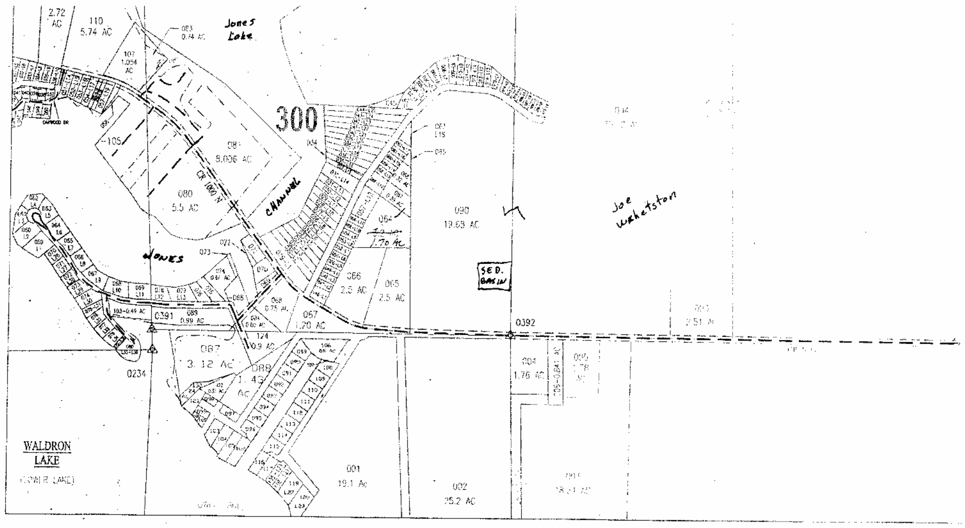
2400 CY x 1.15% expansion factor x 1.05% turns = 2,900 CY

APPENDIX

G


WALDRON
LAKE
STEINBARGER
LAKE





SECTION
7

ORANGE TOWNSHIP
T35N R10E

1 INCH EQUALS 400 FEET

DRAWN BY: SJH UPDATED: 08-06-2004

TOWNSHIP REFERENCE GUIDE

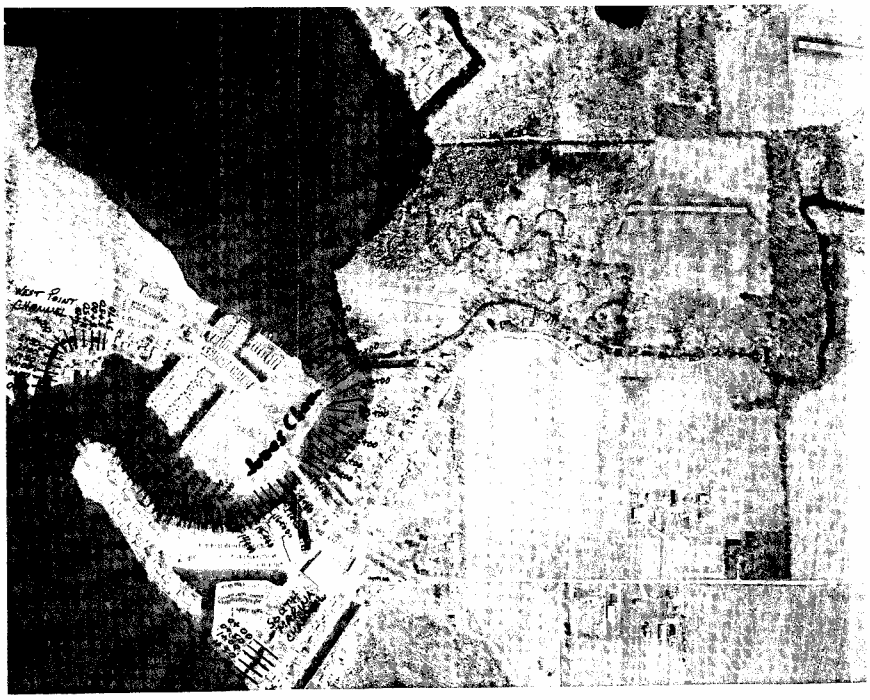
6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

COUNTY REFERENCE GUIDE

Printed by the Noble Co

Orange 18 (T35N, R10E)

Date Printed: Apr 30, 2004



N
W E
S

00 800 1,600
Feet

1 inch equals 400 feet

d by Sanborn, Colorado Springs, Colorado.
l03. Flown at 800 feet Negative Scale.
of 6 inch pixcel at 1"=100' map scale.
t County Surveyor's Office for Assessor's Office.

Noble County Aerial Photography may be obtained at
ty Surveyor's Office.